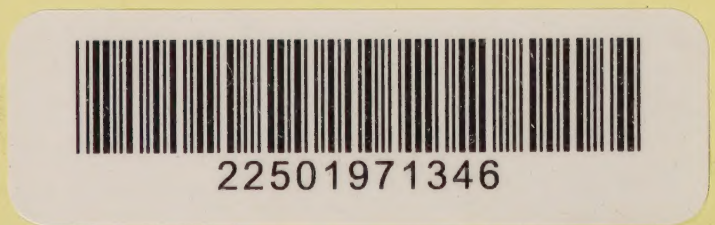
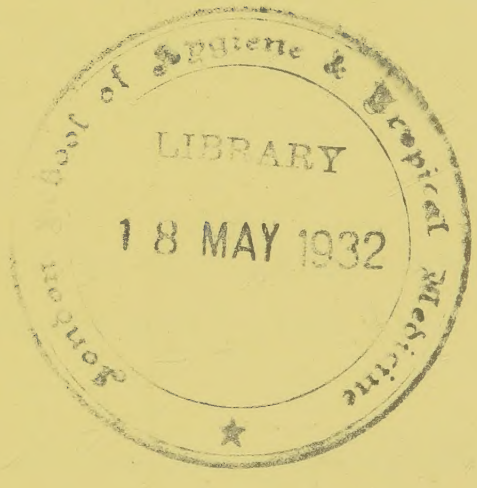
AC.41




London School of Hygiene & Tropical Medicine
LIBRARY
18 MAY 1932

Digitized by the Internet Archive
in 2021 with funding from
Wellcome Library

https://archive.org/details/s4645id1397414

PUBLIC HEALTH.

REPORTS

OF

THE MEDICAL OFFICER OF THE PRIVY COUNCIL AND LOCAL GOVERNMENT BOARD.

NEW SERIES, No. IV.

ANNUAL REPORT TO THE LOCAL GOVERNMENT BOARD WITH REGARD TO THE YEAR 1874.

Presented pursuant to Act of Parliament.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1875.

[C.—1318.] *Price* 1*s.*

TROPICAL MEDICINE LIBRARY

18321

CONTENTS.

	Page
MEDICAL OFFICER'S REPORT - - - - - -	3
APPENDIX:	
No. 1. Digest by Dr. Seaton of the Vaccination Officers' Returns, so far as received down to January 31st, 1874, with regard to children born in the year 1872	17
No. 2. General Order of the Local Government Board under the Vaccination Act of 1874 - - -	35
No. 3. List of the Unions inspected in 1874 as to Vaccination, and account of the awards made to the Public Vaccinators - - - - -	43
No. 4. Statistics of the National Vaccine Establishment and Educational Vaccinating Stations - - -	48
No. 5. Report by Dr. Seaton on the late Epidemic of Small Pox in the United Kingdom in its relation to Vaccination and the Vaccination Laws - -	51
No. 6. Abstract of the Medical Inspections, made in 1874, with regard to matters of local sanitary Administration -	99
No. 7. Report by Dr. Buchanan on infectious diseases in Birmingham and Aston, and on the Hospital Accommodation of those places - - - -	106
No. 8. Report by Dr. Ballard on the sanitary condition of Upper Sedgley Urban Sanitary District - -	123

WELLCOME INSTITUTE LIBRARY
Coll. welMOmec
Call No. Ser WA

2935
Cloth Pabb

REPORT.

TO THE RIGHT HONOURABLE THE PRESIDENT OF THE LOCAL GOVERNMENT BOARD, &c. &c. &c.

SIR,

MEDICAL OFFICER'S REPORT.

IN accordance with the Statute under which I have the honour to act, I submit to you the following statement with regard to proceedings of the Local Government Board in the year 1874 in matters concerning the Public Health.

I beg leave to premise that during 1874 the Medical Department of the Board had less than usual working-power for the purposes to which this Report will relate; principally, because (for temporary reasons) one of the inspectorships was being applied to the Poor-Law purposes of the Board; but partly also, I regret to add, because two of the staff were interrupted in their work, each for several weeks, by illness; and partly, too, because one of the staff had to attend, and this likewise for several weeks, at an International Sanitary Conference held at Vienna.

The proceedings which I have particularly to describe, as taken by the Board through the Medical Department, are of two sorts:

one, not of an immediately administrative intention, but having for its immediate aim to collect and methodise information, wanted for general public use or for the increase of the Board's own efficiency, with regard to moot sanitary questions on which the Board has to advise or direct;

the other, on the contrary, consisting in practical communications with Local Authorities, with an immediate view to the better prevention of disease in each of the respective jurisdictions.

I.

I. *Non-administrative business.*

1. Studies of Nuisance-Prevention.

1. Under the first head I have to report that in 1874 Mr. Netten Radcliffe visited 49 carefully-selected places in Great Britain, including on the one hand several of the chief centres of population, and on the other hand several country-places, with a view to collect all best contemporary experiences as to the means of preventing Excrement-Nuisances in towns and villages. Mr. Radcliffe's report, when complete, seemed to me to have so much immediate interest for local Authorities who might be in difficulty on the matters to which it refers, and was also so essentially connected with the subject-matter of my Supplementary Report of last year—the subject namely of Filth-Diseases and their

MEDICAL OFFICER'S REPORT.

Prevention, that I asked and was favoured with your permission to annex it to that report, presented to Parliament at the end of last session, instead of keeping it back for this year's presentation. As I have already in that connexion turned to account the valuable contents of Mr. Radcliffe's report, I need not now further advert to them; but I would beg leave to express my grateful sense of the service which Mr. Radcliffe rendered, in devoting himself for many months with indefatigable patience to details which only the hope of real public usefulness could make attractive.

2. Foreign Epidemics.

2. As another non-administrative work of the Board in the Medical Department, I have to refer to the cognisance which is kept up of the progress of Foreign Epidemics; partly with regard to any existing possibilities of their extending to this country or its dependencies, and partly with reference to the quarantine-conduct of other countries. In this branch I have of late years had constant assistance from Mr. Netten Radcliffe, who notes for the office all information received from Her Majesty's Indian, Colonial, and Foreign Secretariats, with regard to the epidemics and quarantines of other countries. In 1866, when submitting my 8th Annual Report to the Privy Council, I presented a report by Mr. Radcliffe, bringing down to that date an account of such foreign movements of Cholera as were of interest to this country; and Mr. Radcliffe is now compiling a continuation of that account in a paper which I hope shortly to lay before you in a supplement to the present report.

As regards the foreign epidemics of 1874, I am glad to be able to report further subsidence of the continental Cholera-wave which was seriously threatening us in 1871 and 1872, but has since that time been retreating, and appears now to be at its lowest ebb. On the other hand, I have to state that during 1874 Levantine Plague came into unusual mention in some of the foreign correspondence: that in one of the Yemen provinces of Arabia, among the high-lying villages of the Assur country, which had been visited by the disease in 1816 and 1853, there were considerable outbreaks of plague in 1874; that in Tripoli, too, a small outbreak of plague again affected the encampments of Benghazi, where already there had been an outbreak in 1858; that in the lower Euphrates Valley, where the Hindieh marsh-country had had an outbreak in 1867, the Afij marsh-country (on the opposite side of the river) suffered in 1874 a severe outbreak; and that, at least of the last, the consequences are not yet ended: for the disease spread in both directions, from Kerbela to Samawa, producing very large mortality, and at the date of my present report is still continuing.* Plague has now for so long been comparatively unknown in the countries where it used to be most fatally endemic, and European interest in it has in consequence become

* In the winter 1870–1, there had been an outbreak of plague in Persian Kurdistan, where previously none had been observed since 1835; and when the Hindieh outbreak of 1867 occurred, plague had not been observed in Mesopotamia since 1834.

so nearly obsolete, that, in hearing of outbreaks such as the above, we are without sufficient standards for prognosticating as to their relative importance. Undoubtedly however, the above-mentioned concurrence of outbreaks is exceptional; and if it expresses that plague is really for the time tending to re-development in the countries which formerly bred it, the facts may be of general interest, if only with reference to the derangements of traffic which could hardly fail to arise, were plague again to show itself in any considerable port of the Red Sea or the Mediterranean.

3. International Sanitary Conference.

3. With reference to the International Sanitary Conference, which at the invitation of the Austrian Government was held last summer at Vienna, I have here only to note that Her Majesty's Secretary of State for Foreign Affairs, in consultation with the Board, thought it desirable that an officer of this Department should attend the Conference; and that Dr. Seaton, first Assistant Medical Officer of the Board, was detached for this important and interesting service.

II.

II. *Administrative proceedings.*

The ordinary administrative relations of the Board with Local Authorities in matters directly concerning the Public Health may be divided into those which concern the prevention of *smallpox*, and those which concern the prevention of *other diseases*.

So far as there may be question of comparison between these sections of work, it is requisite to notice the fact (though desirable not to over-rate its significance) that, in regard of smallpox far more minutely than in regard of other diseases, the Legislature has dealt with the *machinery* of the preventive process: the prevention of smallpox having involved compulsion of so distinctive a kind, that, in respect of this, an exceptional quantity of detail comes into the statute-book. If, however, the broad intentions rather than the details be compared, there seems to be no difference of spirit between the law which (for the prevention of smallpox) requires local Authorities, by themselves or their officers, to enforce the vaccination of infants, and the law which (for the prevention of enteric fever and other filth-diseases) requires local Authorities, by themselves or their officers, to enforce the removal of nuisances; and the public is as deeply concerned in the one case as in the other to see that due effect is given to the law by the local Authorities appointed to administer it.

1. For prevention of Smallpox.

1. The prevention of *Small-pox* is an object for which the Board communicates with local Authorities systematically through the Medical Department.

The 647 Boards of Guardians of England and Wales, who, within their respective Unions or Parishes, are the local Vaccination Authorities of the Kingdom, have at work under them, first, for the performance of the vaccinations, more than 3,000

medical practitioners acting as *Public Vaccinators*, and secondly, for the non-medical parts of the business, about 1,400 so-called *Vaccination-Officers;* each Public Vaccinator, and also each Vaccination-Officer, having, under the local Authority, a special area of duty to himself. This local machinery for the prevention of small-pox is subject in certain respects to regulation and control by the Local Government Board, and is superintended and periodically inspected by the Medical Department of the Board with regard to its efficiency of work: the Board in this respect continuing the system which the Lords of the Council, when in sanitary supervision of the country, had established. The local Authorities are required to conform to certain general rules as to the qualifications of persons whom they would appoint to be Public Vaccinators, and as to the attendances which shall be prescribed to these officers: the aims being, in the first respect, that each Vaccinator shall have given proof of being competent to discharge the special duties of the office;* and, in the second respect, that such attendances shall be given as will best facilitate the performance of vaccination with due succession of well-selected lymph.† The Public Vaccinators are required to conform to certain "Instructions" embodying rules of recognised professional sanction, with regard to the precautions which give to vaccination the completest attainable safety and effectiveness.‡ The Vaccination-Officers—who have as their chief functions to secure obedience to the compulsory intentions of the law, and to keep such records and give such notices as are necessary for this purpose, act in all respects under regulations of the Local Government Board, and are required to make such half-yearly reports as may account, in regard of vaccination, for all children whose births have been registered in the respective areas of duty.

The periodical returns made by the Vaccination-Officers throughout the country form the basis on which the Board must mainly rely for its means of estimating the quantitative success of the Vaccination-Laws. The first annual collection of such returns under the Act of 1871 was completed early in 1874; and I subjoin (App. No. 1) a tabular abstract of them, digested, with requisite explanations, by Dr. Seaton. It will be seen that of the 821,856 children registered as born in England and Wales in the year 1872, all, up to a margin of $5\frac{1}{10}$ per cent., have been exactly accounted for by the Vaccination-Officers; and I concur

---

* The necessity for express provision in this sense had long been shown by the experience of the London Smallpox Hospital, as set forth by Mr. Marson, and was abundantly explained in my earlier Reports to the Lords of the Council with reference to their Lordships' Regulations in this matter.

† The necessity for special care to secure this object is explained in a departmental memorandum which I prepared for my Lords in 1859, and which is still in constant use under the Local Government Board, on the sub-division of public vaccination as affecting the supply of vaccine lymph.

‡ Of these "Instructions" (which of course, in the light of increasing knowledge, require re-consideration from time to time) a second and amended issue took place in 1871, it having then been found that one particular class of precautions needed to be more insisted on than before.

in Dr. Seaton's opinion that, when due regard is had to the difficulties of the case, as explained in his note on the appended table, the nearness with which the first year's returns approximate to completeness is such as the Board may deem satisfactory.*

The central Department's inspection of the proceedings of the local Vaccination-Authorities and their officers has since 1867 been so planned that, for ordinary purposes, each vaccination-jurisdiction and each separate duty-area within it, may be visited by a medical Inspector once in every two years; and this probably is the least amount of inspection with which the Board can fairly inform itself that effect is being given to the intentions of the Legislature. The Inspector ascertains the practical working of the local contracts for vaccination, inquires in detail as to the local observance of the regulations which have been made with regard to public vaccinators and vaccination-officers, and (as a final check in regard of those regulations which tend to govern the quality of vaccination) visits and examines such proportion as may be requisite of the children whose names stand on the vaccinator's register as having been "successfully" vaccinated by him. On the results of the above inspections depends the distribution of the money which Parliament votes for public vaccinators; it being characteristic of this grant, that it is not voted on the footing of mere *largesse* in aid of local rates, but has its appropriation expressly limited by the principle of payment on results. The institution of this important influence in favour of the efficiency of public vaccination dates from the Report of the Select Committee of the House of Commons in 1866 on the Vaccination-Laws; and the enactment which on the recommendation of that Committee was made part of the Vaccination Act of 1867 is as follows:—§ 5. "On reports "made to the Lords of Her Majesty's Council with regard to "the number and quality of the vaccinations performed in the "several vaccination-districts of England, or any of them, the "said Lords may from time to time, out of moneys provided by "Parliament, and under regulations to be approved by the Lords "Commissioners of Her Majesty's Treasury, authorize to be "paid to any public vaccinators, in addition to the payments "received by them from guardians or overseers, further payments "not exceeding in any case the rate of one shilling for each child "whom the vaccinator has successfully vaccinated during the "time to which the award of the said Lords of the Council "relates."

In 1874, from causes which I have above mentioned, the vaccination-inspections by the Medical Department fell unavoidably short of their usual amount; but they extended to the pro-

* Shortly after the passing of the Vaccination Act of 1871, the Local Government Board issued under that Act instructions as to the duties of the Vaccination Officers; but under the Act of 1874, these required to be somewhat modified, and a new Order was in consequence issued. The former instructions are given in the first Annual Report of the Board, Appendix A., No. 27. For convenience of reference, the Order under which the officers at present act is subjoined in my present Appendix, No. 2.

ceedings in 275 vaccination-jurisdictions, including the work of 1,357 public vaccinators; and particulars as to these inspections, and as to the awards of money (amounting to 8,204*l.*) which were made out of the Parliamentary grant, are given in Appendix No. 3.

Incidentally to the superintendence of public vaccination, provision has to be made for maintaining and distributing the public supplies of Vaccine Lymph, and with regard to the arrangements under which candidates for appointment as public vaccinators obtain the authorised Certificates of Proficiency in Vaccination required of them under the regulations of the Board. In 1874 the vaccination-stations which are concerned with those special objects underwent their usual special inspection, so far as the circumstances of the year would allow; and the Medical Department during the year supplied vaccine lymph in answer to 10,478 applications. Particulars as to the sources whence this lymph was derived, and as to the applicants who received it, are given, with other statistics of this section of subject-matter, in Appendix No. 4.

In any attempt to judge how far the Board's superintendence and inspection are improving the national defences against small-pox, it is necessary to remember that, though endeavours to improve the quality of public vaccination have to some extent been in progress for the last 15 years, the inspections which were made in the first half of this period, and which proved the necessity for great reforms in the whole system, were powerless to introduce such reforms, and that a really effective mechanism for securing the good quality of public vaccination did not exist till the passing of the Vaccination Act of 1867; that similarly, though compulsory vaccination dates nominally from 22 years ago, our really effective mechanism for securing the quantitative enforcement of the law dates only from the passing of the Vaccination Act of 1871; that though, under the administration of these recent laws as superintended by the Board, the quality of public vaccination in England is now continuously becoming better and better, and the proportion of infants left unvaccinated in successive years is continuously becoming smaller and smaller, hitherto only the youngest of the population can have directly participated in those improvements,* and the benefit of the improved quality of their vaccination (in giving them a comparatively permanent security against fatal small-pox) is one which, from the nature of the case, cannot be tested in them till they are much older. The results may be very clearly foreseen which a continuance of the system must have on our national liabilities to small-pox; but at present, as regards effects already demonstrable, we can only refer to the greatly diminished proportion

* It may be noted, however, that the re-vaccination of the young, as they reach puberty, is an essential part of every perfect system of vaccination; and that, as no such re-vaccination on a large scale is possible, except from the basis of a well-regulated system of infantine vaccination, so the reforms which have been made in infantine vaccination in England, tend in an indirect way to material service beyond the limits of the infant population.

of small-pox among young children, as compared with that of other countries, or as compared with our own in previous times; and on this point some very striking evidence will be found in Dr. Seaton's annexed report (App. No. 5) on the incidence of the terrible epidemic which began in England in the autumn of 1870 and continued till the spring of 1873.

The small-pox which the United Kingdom suffered during those 2½ years was part of a world-wide prevalence of the disease. A generalisation, which from the earliest times has been familiar to the medical profession, is, that the same diseases at different periods of time make epidemics of widely differing degrees of malignity; and as regards the present matter, it seems universally testified by skilled observers that no small-pox epidemic in living memory had been (if I may so express it) of equally malignant intention with that which is here in question. Both in tendency to spread and in severity of individual attacks, it tested to the very utmost the value of such defences as had been provided against it by vaccination; killing the unvaccinated in far more than ordinary proportion; killing also in unusual proportion persons (especially those beyond the period of puberty) whose previous vaccination had been imperfect; and even prevailing more or less against many vaccination-defences which would have borne the stress of any ordinary epidemic. The small-pox deaths in England during the 2½ years of this epidemic were 44,433 in number; and while, to persons who were agitating against the practice of vaccination, it seemed a momentary triumph to boast how "in spite of vaccination" this very sad mortality had befallen us, to others, and particularly to such as were well-informed in the history of small-pox, the reflexion occurred, that *except for vaccination* this epidemic would presumably have caused such frightful and demoralizing mortality as the worst pestilences of past centuries used to bring with them: mortality, in comparison with which even those 44,433 deaths were but few. To demonstrate how true was the latter opinion was of course not possible at the time; for it would require that accumulated statistics of the epidemic (statistics which could not be obtained till two or three years had elapsed) should be investigated with particular regard to the influence which vaccination had exerted; but in a case of this immense interest it seemed due to the general public that the investigation should when possible be made, and the teachings of so great an epidemic be set forth; and such is the purpose of Dr. Seaton's laborious and valuable report which I have the honor of bringing under your consideration. Rendering an account of the late epidemic in each of the three divisions of the United Kingdom, and in various countries and chief towns of continental Europe, and combining with such small-pox statistics as can be given in each case particulars as to the local laws and arrangements for vaccination, Dr. Seaton shows that the experience of this epidemic was in harmony with all previous experiences as to the protective power of vaccination. The

belief which governs the vaccination system of this country—(that properly performed infantine vaccination, duly renewed at puberty, will virtually extinguish small-pox as a fatal disease among such populations as have recourse to it)—has long rested on so vast a basis of well-established facts as not to have needed, for scientific completeness, that any further facts should corroborate it; but, for persons not already familiar with the proofs which gave rise to our present practice, Dr. Seaton's instructive report may adequately serve instead of those proofs to justify our practice as it stands. Anyone can gather from the report the convincing illustrations which it contains, how unabatedly terrible is still the force of small-pox in the present age unless its ravages have been precluded by vaccination; and in adverting to that fact I am glad to be able to connect with it the gratifying reflexion that against this one preventable disease England is now employing with systematic efficiency, and with success which is in constant increase, those happily adequate means of resistance which the genius of an English surgeon first added to the resources of mankind.

2. For prevention of other diseases.

2. With regard to the prevention of *diseases other than small-pox*, the Board during 1874 communicated through this Department with 56 Local Authorities.

The areas of separate sanitary jurisdiction in England and Wales are at present 1,558; that is to say, in addition to the 39 which are Metropolitan, there are 930 urban and 589 rural jurisdictions; and the jurisdictions which were visited by Medical Inspectors last year with reference (general or partial) to the administration of the Sanitary Acts, were 17 rural and 39 urban.* Of these 56 inspections I subjoin (Appendix No. 6) a tabular list, with an abstract of the chief facts which in each case the Board's Inspector reported; and two of the reports are appended *in extenso*, as probably typical in their respective sorts of subject-matter,—one by Dr. Buchanan (Appendix No. 7) relating to the want of hospital-accommodation in Birmingham and Aston for cases of infectious disease,† and one (App. No. 8) by Dr. Ballard on the sanitary state of the Upper Sedgley Sanitary District.

The above communications neither enable me to submit to you any adequate materials for discriminating as to the progress of disease-prevention in the districts of England, nor, I apprehend, can have represented an exertion of the Board's influence in favour of sanitary progress in more than a small fraction of the cases where such progress is urgently wanted.

---

* In one of the 39 urban jurisdictions (Cambridge) the inquiry related only to one particular institution in the town.

† The immediate occasion of this inquiry was a great prevalence of small-pox in the town; but it was mere accident that an epidemic of that disease, rather than one of scarlatina, relapsing fever, or typhus, illustrated the serious want of hospital accommodation, and I therefore class the inquiry in my present section rather than as relating specifically to small-pox prevention.

That progress (more or less) is being made in a considerable number of the jurisdictions of England is, I think, not to be questioned. There is presumption to that effect in the constantly increasing annual amount of the loans contracted by Local Authorities for permanent improvement-purposes which in the main are sanitary, and in which works of sewerage and water-supply largely predominate. In the six accounts from 1858 to 1864 the loans thus contracted under the Sanitary Acts averaged somewhat less than 330,000*l.* per annum; in the six from 1864 to '70 they more than doubled this amount, having averaged per annum nearly 692,000*l.*; thence to the end of 1872 (29 months) the annual average exceeded 884,000*l.*; and in the last two years the respective amounts have been nearly a million, and nearly a million and a half of money.* Other general evidence points in the same direction; as, for instance, in various cases the desire of rural Authorities to acquire special (so-called urban) powers for dealing with the more populous parts of their districts;† and in many individual cases the reports of the local Officers of Health give every assurance which could be desired that good sanitary work is advancing, sometimes even rapidly advancing, in the places reported on. It is certain that in regard of the sanitary requirements of the country there has been, during the last two or three decennia, such growth of knowledge in the public mind as must have given to great numbers of persons a new sense of responsibility in the matter; and here, as in other departments of public conduct, the better knowledge as it grows, the convictions of duty as they ripen, must tend to bear practical fruit. I feel sure that, under influences such as those, very many local Authorities throughout the country are at the present time exerting themselves for sanitary purposes in a degree which, ten or twenty years ago, they would have thought quite unnecessary; and I daresay that, in an appreciable proportion of these cases, the results, either actually or in not very distant promise, are such as may be deemed fairly adequate to the circumstances.

Thus far, however, we have only what is favourable in the facts. Of the larger—I fear very much larger proportion of cases, in which facts of an opposite kind would show themselves to a competent local inquirer, the Board is hitherto not systematically cognisant, except as having before it such evidence as the Quarterly Returns of the Registrar-General contain that preventable death in vast quantities goes on unprevented. These Quarterly Returns are conclusive as to the insufficiency of sanitary endeavour in a very large proportion of our local juris-

---

* The highest sum stated in any previous amount was 1,266,581*l.* borrowed in the period from Aug. 1, 1870, to Aug. 19, 1871, which immediately preceded the passing of the Local Government Board Act. In regard of the very large amount (1,457,496*l.*) borrowed in 1874, it is satisfactory to notice that in it the borrowings of rural authorities amounted to nearly 120,000*l.* All the amounts of loan which I have stated are exclusive of loans under Local Acts.

† The cases in which urban powers as above were granted to rural authorities numbered 10 in the year 1873, and 44 in the year 1874.

dictions; and the evils which remain undealt with may to some extent be inferred from the facts which come to light (as abstracted in my Appendix No. 6) in those cases where the Board authorises medical inspection.

Among the influences which from day to day needlessly waste human life in this country, there are, as is now well known, two which immensely predominate; first, in extreme frequency, such *local conditions of filth and nuisance* as express the failure and in many cases the utter neglect, of local Authorities to fulfil definite obligations which the Sanitary Acts impose on them; secondly, almost everywhere, such *reckless disseminations of contagion* as express in part that penal checks against the wrong are hitherto of little stringency, but express also, and perhaps principally, that local Authorities fail to use with adequate skill and vigour the resources which are in their option to use against the evil. As regards these two most important sections of subject-matter, I have no hesitation in saying that, for many years to come, they will require the utmost intelligence and activity of local Authorities throughout the country to achieve what claims to be done for the due protection of human life.* And it was with reference to the innumerable local insufficiencies which I know to exist in those two great fields of disease-prevention, that I above expressed my opinion as to the proportionate unimportance of such proceedings as the Board has been taking through this Department.

Evidently it is for the Board alone to determine how far it holds itself responsible for taking cognisance of local successes and unsuccesses in regard of the prevention of disease, and for influencing or endeavouring to influence towards better sanitary administration those local Authorities in whose districts the unsuccess betrays itself. I am of course aware that this question is not one to be judged from an exclusively sanitary standpoint, but is part of the general ordering of our civil government, and that justly to decide regarding it is the function, not of medicine, but of statesmanship. In appealing, however, to the latter, I trust that I may not be speaking with an improper prejudice in favour of that great human interest for which it is the privilege of my office to be permitted to speak, if I assume on its behalf that, among the many administrative purposes for which central government in this country claims to criticise and influence and in certain cases control the action of local Authorities, none can be of more national importance than those which relate to the prevention of disease,—none, in regard of which it can be more essential that local disobedience to positive law should not be tolerated,—none, in regard of which it can be more desirable that, so far as occasion exists, and to the extent of existing knowledge and skill in the subject-matter, the detailed

* With reference to this aim in one of its divisions, I last year submitted an endeavour which I had made to codify for general use the experience of this Department in the matter of Filth-Diseases and their Prevention; and in respect of the other division, I hope it may be possible at some future time similarly to codify our experiences as to Contagion.

influence and advice of central government should be given to promote throughout the country the real intentions of the Legislature. And in behoof of these last-mentioned considerations (though with all due reserve and diffidence as regards those to which I first adverted) I have thought it essential to put before you, as matter of proportion, how slight, except in regard of smallpox, is the cognizance which the Board hitherto takes, and how far apart are its exertions of skilled influence, in regard of those local defaults of disease-prevention which annually cost many tens of thousands of lives.

In my last Annual Report, submitting to you some remarks with regard to the relations of the Board to local Sanitary Authorities, and particularly with regard to such of those relations as attach to the Medical Department, I explained the scope and spirit of such medical inspections as I would recommend the Board to adopt as its means of sanitary superintendence. Presuming as principles, first, that local government in proportion as it fulfils its purpose must be exempt from central interference, and secondly, that central interference where admissible must rather be little than much, I submitted, as within those principles, that the Board's intervention should proceed methodically from the basis of local death-accounts: from the evidence, namely, which is afforded in such accounts as to the degrees in which preventable disease has not been prevented. And, while recognising of course that in certain of these cases the object of the Board's intervention could be attained by correspondence, I particularly dwelt on the very great advantage which, at least for many years to come, would in my opinion be gained to the sanitary progress of the country by central inspection systematically organised with reference, so far as needful, to such local defaults as a class:—"By skilled inspections under the Public Health "Act, 1858, on such a scale as practically to represent a central "audit of local death-accounts, and an exertion of central "influence or authority in favour of more active or better-"directed local efforts in places where human life had not been "sufficiently cared for, the Local Government Board would be "in reality, though only in the limited sense which the "law prescribes, a Board of Sanitary Superintendence for "England." Such examination of local sanitary proceedings as is hitherto undertaken by the Board is on the basis above suggested; but with regard to the question of its present proportion to local shortcomings, I may state that the quantity of medical inspecting-force available to the Department for this branch of service is but about equal to the employment of three Inspectors; that the sanitary jurisdictions of England are, as above enumerated, 1,558; and that the mortality, other than by small-pox, to be accounted for (of course in very different proportions) by the 1,558 local Authorities, as due to causes more or less under control of law, and as principally attaching to those two great fields of disease-causation which I have specially mentioned, amounts, in the common estimate of informed persons, to at least 120,000 deaths per annum.

With regard to about 900 of the 1,558 jurisdictions, the Board is entitled to receive copies of the reports of local Officers of Health, appointed under the Order of the Board, and paid in half from funds provided by Parliament; and there are considerable parts of the country with regard to which it may be ascertained from such reports that the local Authorities are already receiving excellent advice from highly-qualified officers whom they have appointed, and that in many cases they are duly acting upon such advice. But as regards the relations of the Central Board to the facts of sanitary unsuccess which become known to it, the following three considerations have to be remembered: first, that in certain cases local Authorities, though provided with admirable Officers of Health, may be entirely disregarding their advice; secondly, that in very many of the cases in which the Board is entitled to receive copies of the reports of the local officers, those which come to hand are of little or no assistance to the Board in the sense which is here in question, but rather give reason to believe that the local officer might be very materially assisted by the visit of a medical Inspector of the Board; and thirdly, that, with regard to about 658 of the 1,558 jurisdictions, the Board (as not paying partof the local salaries) is not entitled to receive copies of the local reports.

It importantly concerns the second of these considerations to notice that, at the time when the Legislature suddenly made it an obligation on each of the local Sanitary Authorities of England to appoint one or more Officers of Health, the members of the Medical Profession who had given such study to sanitary science and administration as would fairly qualify them to be Officers of Health in any distinctive sense of the term were comparatively but very few; that therefore the new appointments had generally to be made without reference to proofs of distinctive qualification; and that in a large proportion of cases, the local Officer of Health, appointed as such with the approval of the Board, is in fact (as the Royal Commission recommended he should be) the Poor Law Medical Officer serving *quasi ex officio* in the second capacity. When regard is had to these facts, it will be evident that the advance of the new officers to a state of efficiency in which their reports may uniformly be regarded as adequate to the circumstances of the respective districts, must of necessity be a gradual process extending over years, and requiring the best assistance of suitable organization. And the fact (of which the Medical Profession has great reason to be proud) that the new offices are already in so many cases filled with credit, and in a notable number of cases with really eminent ability and success, must not obscure the fact, that, before such standards can be general in the country, very much work will have to be done, and very many difficulties surmounted.

I am, Sir, your obedient servant,

JOHN SIMON.

Medical Department,
March 31st, 1875.

APPENDIX.

APPENDIX.

No. 1.

DIGEST, by Dr. SEATON, of the VACCINATION OFFICERS' RETURNS, so far as received down to January 31st 1874, with regard to Children born in the year 1872.

The following is the first annual return under the Vaccination Act, 1871, and has reference to the children born in England and Wales in 1872. It shows that of 821,856 births returned to the Board by the several Vaccination Officers in the kingdom as registered during that year, 698,137 (being 85 per cent. of the whole), had been registered as successfully vaccinated at the time the return was made; 1,693 (or 0·2 per cent. of the whole), had been registered as insusceptible of successful vaccination*; 905 (or 0·11 per cent. of the whole), as having contracted small-pox before they could be vaccinated; and 78,594 or (9·5 per cent.) as having died before they could be vaccinated; leaving 42,527, or 5·1 per cent., of the births still to account for. If from the 821,856 births deduction of the deaths without vaccination be first made, it appears that of the surviving 743,262 children, about 94 per cent. (93·92) were returned as successfully vaccinated; 0·35 per cent. as either insusceptible of vaccination or having had small-pox; and 5·72 per cent. as still to account for.†

The cases returned as "not finally accounted for" consist almost entirely of (1) cases in which vaccination at the time of the return was postponed on account of the children's state of health; (2) cases in which vaccination had really been performed successfully, but which could not be registered as vaccinated on account of a legal certificate of the vaccination not having been yet received by the vaccination officers; (3) cases which, having removed from the district or place of birth before vaccination, or having (as is not uncommon in the case of illegitimate children) been registered under false names or false addresses, could not be traced by the vaccination officers; and (4) cases which, in certain Unions, from the imperfect development of the machinery of the Act, or from the want of due understanding of his duties on the part of the vaccination officer, had not been properly looked after. The number of cases in which there was direct refusal on the part of parents to have their children vaccinated, or in which legal proceedings had to be taken to secure this result, constitutes an utterly insignificant proportion of the cases unaccounted for.

Considering that this was the first year's working of an Act the execution of which devolves on upwards of 1,400 local officers, appointed by, and acting under the direction of, 647 boards of guardians; that in many unions more or less delay in making these appointments was inevitable on account of various matters of detail which required to be arranged; that the duties devolving on the officers themselves were to all of them in some respects new, and to a very large proportion, if not to the majority of them, altogether new, and that as a necessary

* By this of course all that is meant is that the children had been three times unsuccessfully vaccinated, and were no longer therefore subject to the compulsory provisions of the law.

† The return as to the births registered from January to June 1872 was made on the 31st July 1873; and that as to the births registered from July to December 1872, was made on the 31st January 1874. In consequence of correspondence from the Board a considerable deduction from the cases unaccounted for at the time of the returns has since been made.

consequence they were by many of them at starting imperfectly understood; the return, rendering as it does exact account, in respect of the vaccination laws, of 95 per cent. of the year's births, must, it appears to me, be considered as remarkably satisfactory.

It will be seen that the proportion of cases "not finally accounted for" in the Metropolis considerably exceeds the average of the kingdom. This is chiefly due (1) to the difficulty in working which arises in London from the large proportion of lodgers and persons living in tenemented houses, and from the constant removals taking place from Union to Union, or frequent changes of dwelling in the same Union; (2) to the appointments of vaccination officers in some of the unions having been insufficient for the amount of work to be done, and to two or three of the officers first appointed having proved very inefficient.

When the Metropolitan unions are deducted from the rest of the kingdom, the proportion of births "not finally accounted for" in the latter is reduced to 4·5 per cent. To this proportion the different counties contribute very variously; and to a certain extent variation must be expected. It is obviously much easier, for example, to trace children in such counties as Bedford, Berks, or Bucks, than it can be in a county like Lancashire: and the return for the latter county, which shows only 3·4 per cent. of its births not finally accounted for, is, it appears to me, indicative of quite as careful general working as the returns from the former, which show the proportions for them to be 2·4, 2·3, and 2·8 per cent. respectively. It will be seen, however, in the table that wherever a county exhibits an unusually large proportion of cases unaccounted for, this is almost invariably due to the existence in it of some one union or more (but usually only one) in which the default has been considerable; default which, with rare exceptions, has no other cause than the incapacity or general neglect of the vaccination officer or officers, and their inefficient supervision by the local authority.

If from the 617 extra-metropolitan unions 39 unions in which there was an exceptional proportion of cases thus unaccounted for,* and in regard of which the Local Government Board consequently remonstrated with the respective Boards of Guardians, be deducted, it will be found that of 653,811 births registered in the remaining 578 unions in 1872, all but 23,841, or 3·6 per cent., were finally accounted for in the vaccination registers at the time the returns were made. For the sake of comparison it may be noted that in the same year in Scotland (where a system similar to that established in England under the Act of 1871 had been in operation for 9 years with a success which the Registrar-General for Scotland has frequently reported as marvellous) the proportion of cases unaccounted for, including postponements, was 2·658 per cent. of the births.† The much greater relative extent to which population is aggregated in large towns in England than in Scotland must always make it a matter of greater difficulty to trace cases of neglect in the former than in the latter division of the United Kingdom.

---

* These unions were Ely, Birkenhead, Stratton, Okehampton, Blandford, Gateshead, Darlington, Cheltenham, Leominster, Weobly, Ashby-de-la-Zouch, Caistor, Lincoln, Brentford, Pontypool, East and West Flegg, Swaffham, Potterspury, Nottingham, Banbury, Headington, Wells, Southampton, Burton-on-Trent, Leek, Tamworth, Hoxne, Mutford and Lothingland, Epsom, Brighton, Sheffield, Aberystwith, Lampeter, Tregaron, Corwen, Festiniog, Newtown and Llanidloes, Knighton, Rhayader. The correspondence which has taken place on these returns between the Board and the Guardians of the respective unions, as well as with other unions in which the returns had shown defect though of less considerable amount, has resulted, as already stated, in a large number of the cases unaccounted for in the returns having since been accounted for.

† The proportion not finally accounted for in Scotland in this year was somewhat smaller than usual. On the average of 10 years (1864–1873) it has been 3 per cent. (2,986) of the births, which number includes ·706 per cent. of postponements.

Returns.

App. No. 1.

Digest of Vaccination Returns.

—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Smallpox.	Dead, Unvaccinated.	Remaining.	Per-centage not finally accounted for.
ENGLAND AND WALES.	821,856	698,137	1,693	905	78,594	42,527	5·1
Do. excluding Metropolitan Unions.	703,603	601,243	1,339	835	68,080	32,106	4·5
The Metropolitan Unions.	118,253	96,894	354	70	10,514	10,421	8·8
Counties.							
Bedford - -	5,365	4,687	3	—	544	131	2·4
Berks - -	7,476	6,748	6	1	548	173	2·3
Bucks - -	5,346	4,679	12	—	502	153	2·8
Cambridge - -	6,530	5,580	9	2	607	332	5·1
Chester - -	18,354	15,787	22	1	1,695	849	4·6
Cornwall - -	11,211	9,458	21	42	1,220	470	4·2
Cumberland -	7,746	6,802	19	9	734	182	2·3
Derby - -	12,133	10,407	38	13	1,241	434	3·5
Devon - -	18,356	16,045	42	20	1,477	772	4·2
Dorset - -	5,801	5,058	19	—	448	276	4·7
Durham - -	34,015	28,058	61	52	4,116	1,728	5·1
Essex - -	15,273	13,350	32	4	1,190	697	4·5
Gloucester - -	16,107	13,688	54	4	1,310	1,051	6·5
Hereford - -	3,615	3,116	9	—	252	238	6·5
Herts - -	7,300	6,496	12	2	635	155	2·1
Hunts - -	1,998	1,791	3	1	172	31	1·5
Kent (extra metropolitan).	21,149	18,966	36	31	1,587	529	2·5
Lancaster - -	115,386	99,806	111	29	11,420	4,020	3·4
Leicester - -	10,227	8,324	17	24	1,262	600	5·8
Lincoln - -	14,306	11,855	47	5	1,520	879	6·1
Middlesex (extra metropolitan).	8,311	6,480	19	3	641	1,168	14·0
Monmouth - -	7,907	6,561	17	18	685	626	7·9
Norfolk - -	13,365	11,122	43	17	1,538	645	4·8
Northampton -	8,896	7,450	19	18	1,004	405	4·5
Northumberland -	14,700	12,616	28	15	1,559	482	3·2
Nottingham -	13,013	10,487	33	15	1,524	954	7·3
Oxford - -	5,764	4,831	12	5	517	390	6·9
Rutland - -	695	619	1	—	64	11	1·5
Shropshire - -	8,470	7,550	20	5	718	177	2·1
Somerset - -	15,229	13,095	47	8	1,340	739	4·8
Southampton -	17,038	14,859	39	39	1,290	811	4·7
Stafford - -	31,038	26,540	46	71	2,993	1,388	4·4
Suffolk - -	11,563	10,060	23	11	976	493	4·2
Surrey (extra Metropolitan).	11,173	9,569	17	3	803	781	6·9
Sussex - -	13,390	11,210	60	—	1,197	923	7·6
Warwick - -	23,768	20,434	17	14	2,225	1,078	4·5
Westmoreland -	2,062	1,890	5	—	150	17	·8
Wilts - -	7,670	6,873	10	1	547	239	3·1
Worcester - -	18,723	15,934	33	170	1,952	634	3·3
York, E.R. -	10,877	9,187	33	7	1,280	370	3·4
York, N.R. -	8,299	7,078	22	1	882	316	3·8
York, W.R. -	72,123	60,705	121	73	8,021	3,203	4·4

App. No. 1.

Digest of Vaccination Returns.

—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.	Per-centage not finally accounted for.
WALES.							
Anglesey - -	958	789	13	2	99	55	5·7
Brecknock - -	1,815	1,513	9	8	175	110	6·1
Cardigan - -	2,238	1,381	8	1	201	647	28·9
Carmarthen -	4,115	3,717	4	2	296	96	2·3
Carnarvon - -	3,415	3,009	12	—	315	79	2·3
Denbigh - -	2,656	2,275	—	1	269	111	4·1
Flint - -	2,777	2,438	2	2	270	65	2·3
Glamorgan -	16,228	14,334	39	84	1,401	370	2·3
Merioneth - -	2,100	1,477	—	—	195	428	20·3
Montgomery -	2,238	1,718	5	1	225	289	12·9
Pembroke - -	2,650	2,255	4	—	202	189	7·1
Radnor - -	645	486	5	—	46	108	16·7

UNIONS.

—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
METROPOLITAN UNIONS.						
Bethnal Green - - -	5,215	4,250	6	6	447	506
Camberwell - - -	4,293	3,513	16	—	388	376
Chelsea - - - -	2,325	1,943	6	—	210	166
Fulham - - - -	2,522	2,074	6	1	213	228
George's, St. - - -	4,190	3,667	35	2	324	162
George St., East - -	1,908	1,353	—	—	186	369
Giles and George, S.S. - -	1,825	1,389	2	—	197	237
Greenwich - - -	3,849	3,327	10	2	320	190
Hackney - - -	4,400	3,457	12	6	343	582
Hampstead - - -	810	655	6	—	62	87
Holborn - - - -	6,026	5,072	8	6	558	382
Islington - - -	7,975	6,677	18	2	689	589
Kensington - - -	4,082	3,480	23	—	347	232
Lambeth - - - -	8,148	6,320	35	6	763	1,024
Lewisham - - -	1,716	1,551	2	1	122	40
London, City - - -	1,853	1,576	11	1	169	96
Mary-le-bone - - -	5,190	4,009	16	3	552	610
Mile End Old Town - -	3,979	3,249	7	4	358	361
Olave, St. - - -	5,213	4,413	11	2	537	250
Paddington - - -	2,832	2,284	15	—	251	282
Pancras, St. - - -	7,936	6,282	23	2	480	1,149
Poplar - - - -	5,059	4,180	12	15	522	330
Saviour, St. - - -	6,966	5,596	39	—	687	644
Shoreditch - - -	5,352	4,279	16	2	471	584
Stepney - - - -	2,047	1,621	3	3	225	195
Strand - - - -	1,024	841	2	1	108	72
Wandsworth and Clapham -	4,491	3,886	11	—	369	225
Westminster - - -	1,424	1,192	1	1	141	89
Whitechapel - - -	2,741	2,241	—	1	269	230
Woolwich - - -	2,862	2,517	2	3	206	134

—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Smallpox.	Dead, Unvaccinated.	Remaining.
BEDFORDSHIRE.						
1 Ampthill - - -	643	575	—	—	65	3
2 Bedford - - -	1,347	1,208	1	—	124	14
3 Biggleswade - -	1,060	938	—	—	113	9
4 Leighton Buzzard - -	662	574	—	—	55	33
5 Luton - - -	1,281	1,072	1	—	156	52
6 Woburn - - -	372	320	1	—	31	20
BERKS.						
7 Abingdon - - -	741	656	—	—	81	4
8 Bradfield - - -	479	457	—	—	21	1
9 Cookham - - -	511	461	1	—	32	17
10 Easthampstead - -	322	298	1	—	20	1
11 Faringdon - - -	470	437	—	—	28	5
12 Hungerford - -	605	553	—	—	41	11
13 Newbury - - -	658	565	—	1	49	43
14 Reading - - -	1,273	1,127	1	—	119	26
15 Wallingford - -	491	447	—	—	39	5
16 Wantage - - -	566	514	2	—	34	16
17 Windsor - - -	831	748	1	—	52	30
18 Wokingham - -	531	485	—	—	32	14
BUCKS.						
19 Amersham - - -	624	542	2	—	71	9
20 Aylesbury - - -	821	682	1	—	85	53
21 Buckingham - -	437	369	4	—	47	17
22 Eton - - -	815	741	—	—	53	21
23 Newport Pagnell - -	887	775	4	—	76	32
24 Winslow - - -	316	288	1	—	25	2
25 Wycombe - - -	1,446	1,282	—	—	145	19
CAMBRIDGE.						
26 Cambridge - - -	937	811	4	1	95	26
27 Caxton and Arrington -	461	413	1	—	43	4
28 Chesterton - - -	998	844	2	—	96	56
29 Ely - - -	781	555	—	—	99	127
30 Linton - - -	439	409	—	1	16	13
31 Newmarket - - -	942	823	—	—	85	34
32 N. Witchford - -	602	546	—	—	51	5
33 Whittlesey - - -	235	183	—	—	17	35
34 Wisbeach - - -	1,135	996	2	—	105	32
CHESHIRE.						
35 Altrincham - -	1,599	1,416	2	—	127	54
35a Birkenhead - -	3,263	2,610	3	—	286	364
36 Tarvin - - -	339	302	—	—	26	11
37 Chester - - -	1,325	1,095	1	—	147	82
38 Congleton - - -	1,234	1,070	2	—	144	18
39 Macclesfield - -	1,950	1,716	2	—	220	12
40 Nantwich - - -	1,998	1,736	4	1	134	125
41 Northwich - - -	1,072	980	—	—	83	9
42 Runcorn - - -	1,167	1,046	—	—	104	17
43 Stockport - - -	3,642	3,138	6	—	366	132
44 Wirrall - - -	765	678	2	—	58	27

App. No. 1.

Digest of Vaccination Returns.

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	CORNWALL.						
45	Austell, St.	1,010	876	—	5	102	27
46	Bodmin	560	492	—	—	47	21
47	Camelford	266	228	—	—	25	13
48	Columb, St., Major	553	475	—	—	55	23
49	Falmouth	785	683	—	—	76	26
50	Germans, St.	524	477	2	—	42	3
51	Helston	880	657	2	2	135	84
52	Launceston	568	506	6	—	35	21
53	Liskeard	1,099	963	3	—	90	43
54	Penzance	1,826	1,519	1	14	271	21
55	Redruth	1,785	1,497	4	18	213	53
56	Stratton	228	153	—	—	17	58
57	Truro	1,127	932	3	3	112	77
	CUMBERLAND.						
58	Alston with Garrigill	176	155	—		21	—
59	Bootle	320	290	1	—	24	5
60	Brampton	288	254	—	—	30	4
61	Carlisle	1,494	1,319	1	—	149	25
62	Cockermouth	1,747	1,539	6	—	166	34
63	Longtown	239	207	3	2	21	8
64	Penrith	746	671	—	—	63	12
65	Whitehaven	1,956	1,684	7	7	193	65
66	Wigton	780	683	1	—	67	29
	DERBY.						
67	Ashbourne	639	565	1	—	63	10
68	Bakewell	842	697	—	1	58	86
69	Belper	1,974	1,780	2	—	176	16
70	Chapel-en-le-Frith	529	426	9	—	58	36
71	Chesterfield	3,315	2,793	6	10	363	143
72	Derby	2,535	2,192	6	1	274	62
73	Glossop	701	574	2	1	75	49
74	Hayfield	417	341	6	—	55	15
75	Shardlow	1,181	1,039	6	—	119	17
	DEVON.						
76	Axminster	550	483	3	—	46	18
77	Barnstaple	1,048	954	—	2	62	30
78	Bideford	582	503	2	5	45	27
79	Crediton	577	514	1	—	43	19
80	East Stonehouse	563	473	1	4	74	11
81	Exeter	1,089	892	1	—	145	51
82	Holsworthy	291	262	4	—	15	10
83	Honiton	709	585	5	—	62	57
84	Kingsbridge	605	549	—	—	32	24
85	Newton Abbott	2,029	1,818	1	—	155	55
86	Okehampton	608	464	—	—	43	101
87	Plymouth	2,087	1,779	9	6	209	84
88	Plympton St. Mary	665	556	—	—	59	50
89	South Molton	557	474	1	—	38	44
90	Stoke Damerel	1,457	1,331	1	2	97	26
91	Tavistock	912	809	4	—	60	39
92	Thomas, St.	1,457	1,312	2	—	107	36
93	Tiverton	898	796	5	1	67	29
94	Torrington	538	460	1	—	31	46
95	Totnes	1,134	1,031	1	—	87	15

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	DORSET.						
96	Beaminster	392	339	—	—	41	12
97	Blandford	431	285	—	—	39	107
98	Bridport	574	517	—	—	42	15
99	Cerne	226	199	1	—	17	9
100	Dorchester	561	514	—	—	40	7
101	Poole	550	482	5	—	50	13
102	Shaftesbury	382	331	2	—	23	26
103	Sherborne	389	341	3	—	34	11
104	Sturminster	368	331	—	—	32	5
105	Wareham and Purbeck	514	460	7	—	37	10
106	Weymouth	889	800	1	—	53	35
107	Wimborne and Cranborne	525	459	—	—	40	26
	DURHAM.						
108	Auckland	3,209	2,588	12	9	481	119
109	Chester-le-Street	1,483	1,273	3	1	187	19
110	Darlington	1,699	1,331	—	20	177	171
111	Durham	2,279	1,765	10	2	324	178
112	Easington	1,610	1,355	1	—	183	71
113	Gateshead	3,667	2,759	4	1	486	417
113a	Hartlepool	1,975	1,721	—	4	212	38
114	Houghton-le-Spring	1,154	1,006	1	—	118	29
115	Lanchester	1,871	1,529	—	5	221	116
116	Sedgefield	629	508	—	1	79	41
117	South Shields	3,597	2,992	10	4	421	170
118	Stockton	4,234	3,619	6	5	469	135
119	Sunderland	5,234	4,461	14	—	617	142
120	Teesdale	647	539	—	—	69	39
121	Weardale	727	612	—	—	72	43
	ESSEX.						
122	Billericay	527	434	2	—	46	45
123	Braintree	581	523	1	—	49	8
124	Chelmsford	1,048	937	8	—	69	34
125	Colchester	882	780	1	—	87	14
126	Dunmow	643	606	—	—	36	1
127	Epping	566	436	4	—	38	*88
128	Halstead	607	474	—	—	47	86
129	Lexden and Winstree	845	769	3	—	60	13
130	Maldon	791	710	—	1	66	14
131	Ongar	353	275	2	—	31	45
132	Orsett	564	508	—	—	36	20
133	Rochford	722	666	—	—	48	8
134	Romford	1,158	971	4	1	102	80
135	Saffron Walden	665	602	3	—	46	14
136	Tendring	636	470	—	—	54	†112
137	West Ham	4,199	3,740	4	2	341	112
138	Witham	486	449	—	—	34	3
	GLOUCESTER.						
139	Bristol	1,940	1,657	4	2	185	92
140	Cheltenham	1,370	815	6	1	149	399
141	Chipping Sodbury	609	483	9	—	47	70

* No return received for the Epping district for the first half of 1872.
† No return received for the Harwich district for the second half of 1872.

App. No. 1.

Digest of Vaccination Returns.

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	GLOUCESTER—*cont.*						
142	Cirencester - -	623	565	3	—	32	23
143	Clifton - - -	4,853	4,177	13	—	386	277
144	Dursley - - -	361	314	10	—	23	14
145	Gloucester - - -	1,426	1,250	4	1	122	49
146	Newent - - -	386	357	—	—	25	4
147	Northleach - - -	363	328	—	—	28	7
148	Stow-on-the-Wold - -	303	258	—	—	23	22
149	Stroud - - -	1,265	1,133	—	—	112	20
150	Tetbury - - -	180	165	—	—	12	3
151	Tewkesbury - -	435	389	—	—	28	18
152	Thornbury - - -	538	489	1	—	27	21
153	Westbury-on-Severn -	881	801	2	—	64	14
154	Wheatenhurst - -	231	215	1	—	13	2
155	Winchcomb - -	343	292	1	—	34	16
	HEREFORD.						
156	Bromyard - - -	344	301	2	—	23	18
157	Dore - - -	292	257	—	—	22	13
158	Hereford - - -	1,026	908	—	—	81	37
159	Kington - - -	385	339	1	—	33	12
160	Ledbury - - -	330	292	—	—	11	27
161	Leominster - -	467	344	3	—	33	87
162	Ross - - -	473	427	1	—	33	12
163	Weobley - - -	298	248	2	—	16	32
	HERTS.						
164	St. Albans - - -	704	620	2	1	68	13
165	Barnet - - -	775	711	1	—	50	13
166	Berkhampstead - -	511	449	1	—	49	12
167	Bishop's Stortford - -	706	634	—	1	53	18
168	Buntingford - -	209	177	—	—	29	3
169	Hatfield - - -	235	210	1	—	22	2
170	Hemel Hempstead - -	519	466	—	—	51	2
171	Hertford - - -	478	393	1	—	41	43
172	Hitchin - - -	991	888	1	—	91	11
173	Royston - - -	711	631	1	—	73	6
174	Ware - - -	537	484	3	—	34	16
175	Watford - - -	848	766	1	—	66	15
176	Welwyn - - -	76	67	—	—	8	1
	HUNTS.						
177	Huntingdon - -	720	638	—	—	67	15
178	St. Ives - - -	659	590	1	—	59	9
179	St. Neots - - -	619	563	2	1	46	7
	KENT (extra metropolitan).						
180	Ashford, East - -	417	387	—	—	24	6
181	Ashford, West - -	570	523	3	—	34	10
182	Blean - - -	637	577	—	1	52	7
183	Bridge - - -	375	338	2	—	32	3
184	Bromley - - -	1,115	970	3	—	77	65
184a	Canterbury - -	498	444	2	—	38	14
185	Cranbrook - - -	456	407	—	—	27	22
186	Dartford - - -	1,513	1368	2	—	113	35
187	Dover - - -	1,221	1037	4	27	113	40

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	KENT—*cont.*						
188	Eastry - - -	787	695	3	—	64	25
189	Elham - - -	909	853	—	—	37	19
190	Faversham - - -	814	736	2	1	65	10
191	Gravesend and Milton -	638	586	—	—	43	9
193	Hollingbourn - -	478	419	1	—	52	6
194	Hoo - - -	110	97	—	—	9	4
196	Maidstone - - -	1359	1218	2	—	100	39
197	Malling - - -	836	736	2	—	77	21
198	Medway - - -	1917	1748	—	2	127	40
199	Milton - - -	785	719	—	—	59	7
200	North Aylesford - -	829	752	—	—	69	8
201	Romney Marsh - -	229	208	1	—	17	3
202	Seven Oaks - -	820	736	1	—	62	21
203	Sheppey - - -	630	572	1	—	45	12
204	Tenterden - - -	358	324	1	—	20	13
205	Thanet, I. of - -	1305	1,148	1	—	102	54
206	Tonbridge - - -	1543	1,373	5	—	129	36
	LANCASHIRE.						
207	Ashton-under-Lyne -	5,242	4,627	2	—	517	96
207b	Barton-upon-Irwell -	1,880	1,636	1	—	154	89
208	Blackburn - - -	6,283	5,588	2	—	613	80
209	Bolton - - -	6,633	5,800	6	7	664	156
210	Burnley - - -	3,649	3,196	2	—	368	83
211	Bury - - -	4,128	3,561	3	—	469	95
212	Chorley - - -	1,639	1,468	—	—	152	19
213	Chorlton - - -	8,541	7,511	21	11	845	153
214	Clitheroe - - -	702	644	1	—	45	12
215	Fylde, The - -	1,049	952	1	—	84	12
216	Garstang - - -	400	366	—	—	27	7
217	Haslingden - -	3,018	2,686	2	—	292	38
218	Lancaster - - -	1,119	989	1	—	105	24
219	Leigh - - -	1,701	1,545	—	—	139	17
220	Liverpool - - -	8,508	6,907	5	—	986	610
220a	Lunesdale - - -	187	166	2	—	16	3
221	Manchester - -	7,010	5,893	2	1	828	286
222	Oldham - - -	5,088	4,472	3	2	470	141
223	Ormskirk - - -	2,013	1,785	2	—	180	46
224	Prescot - - -	3,825	3,236	1	—	319	269
225	Preston - - -	4,673	3,903	2	2	580	186
225a	Prestwich - - -	3,001	2,621	3	1	277	99
226	Rochdale - - -	4,052	3,385	13	—	407	247
227	Salford - - -	5,662	4,840	10	—	596	216
228	Todmorden - -	1,095	963	2	—	120	10
228a	Toxteth Park - -	3,556	3,048	—	—	280	228
229	Ulverstone - -	2,575	2,162	3	1	249	160
230	Warrington - -	2,217	1,882	12	2	204	117
231	West Derby - -	10,862	9,405	9	1	983	464
232	Wigan - - -	5,078	4,569	—	1	451	57
	LEICESTER.						
234	Ashby-de-la-Zouch -	1,092	745	—	1	108	238
235	Barrow-on-Soar - -	771	623	—	2	108	38
236	Billesdon - - -	194	166	3	—	20	5
237	Blaby - - -	562	405	1	3	73	80
238	Hinckley - - -	631	3,422	—	1	64	23
239	Leicester - - -	4,154	543	6	16	574	136

App. No. 1.

Digest of Vaccination Returns.

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	LEICESTER—*cont.*						
240	Loughborough - -	904	754	1	1	119	29
241	Lutterworth - -	397	353	—	—	39	5
242	Market Bosworth - -	463	399	3	—	56	5
243	Market Harborough -	482	432	—	—	39	11
244	Melton Mowbray - -	577	482	3	—	62	30
	LINCOLN.						
245	Boston - - -	1,255	1,080	1	—	121	53
246	Bourn - - -	684	549	3	—	117	15
247	Caistor - - -	1,636	1,170	—	—	184	282
248	Gainsborough - -	908	744	—	—	99	65
249	Glanford Brigg - -	1,284	1,119	3	1	132	29
250	Grantham - - -	993	878	—	1	83	31
251	Holbeach - - -	669	552	1	—	64	52
252	Horncastle - - -	733	628	12	2	76	15
253	Lincoln - - -	1,818	1,382	12	1	247	176
254	Louth - - -	1,088	900	6	—	133	49
255	Sleaford - - -	970	897	1	—	69	3
256	Spalding - - -	754	677	1	—	60	16
257	Spilsby - - -	926	772	7	—	78	69
258	Stamford - - -	588	507	—	—	57	24
	MIDDLESEX (extra metropolitan).						
260	Brentford - - -	2,345	1,463	2	—	132	748
263	Edmonton - - -	3,118	2,604	3	2	242	267
269	Hendon - - -	1,360	1,106	13	—	140	101
282c	Staines - - -	681	596	1	1	60	23
282f	Uxbridge - - -	807	711	—	—	67	29
	MONMOUTH.						
283	Abergavenny - -	438	390	—	1	31	16
283a	Bedwellty - - -	2,279	1,873	6	9	182	209
284	Chepstow - - -	565	495	5	—	41	24
285	Monmouth - - -	1,032	873	2	—	126	31
286	Newport - - -	2,253	1,981	3	7	200	62
287	Pontypool - - -	1,340	949	1	1	105	284
	NORFOLK.						
288	Aylsham - - -	534	471	—	—	50	13
289	Blofield - - -	346	310	—	—	31	5
290	Depwade - - -	757	611	9	—	78	59
291	Docking - - -	541	478	1	—	46	16
292	Downham - - -	660	585	2	—	66	7
293	Erpingham - -	584	505	4	—	67	8
294	St. Faith - - -	340	306	—	—	29	5
295	Flegg, E. and W. - -	363	233	—	—	49	81
296	Forehoe - - -	336	256	—	—	56	24
297	Freebridge Lynn - -	399	344	3	—	40	12
298	Guiltcross - - -	330	279	5	—	30	16
299	Henstead - - -	320	279	1	—	37	3
300	King's Lynn - -	490	427	2	—	51	10
301	Loddon and Clavering -	441	397	3	—	32	9
302	Mitford and Launditch -	834	743	—	—	80	11
303	Norwich - - -	2,605	2,122	12	16	357	98
304	Swaffham - - -	391	284	—	—	50	57
305	Thetford - - -	561	439	—	—	63	59

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	NORFOLK—*cont.*						
306	Smallburgh - - -	442	362	—	—	47	33
307	Walsingham - -	581	484	1	—	53	43
308	Wayland - - -	325	274	—	—	42	9
309	Yarmouth, Gt. - -	1,185	933	—	1	184	67
	NORTHAMPTON.						
310	Brackley - - -	462	377	2	—	60	23
311	Brixworth - - -	420	347	1	—	48	24
312	Daventry - - -	610	515	—	—	62	33
313	Hardingstone - -	388	331	3		47	7
314	Kettering - - -	647	559	—	—	69	*19
315	Northampton - -	2,024	1,613	5	18	272	116
316	Oundle - - -	463	398	1	—	44	20
317	Peterborough - -	1,358	1,237	—	—	110	11
318	Potterspury - -	375	283	—	—	37	55
319	Thrapston - - -	550	487	1	—	54	8
320	Towcester - - -	423	358	5	—	53	7
321	Wellingborough - -	1,176	945	1	—	148	82
	NORTHUMBERLAND.						
322	Alnwick - - -	624	552	1	—	51	20
323	Belford - - -	146	136	1	—	5	4
324	Bellingham - -	217	199	—	—	14	4
325	Berwick-on-Tweed - -	584	530	—	—	41	13
326	Castle Ward - -	571	495	2	3	45	26
327	Glendale - - -	310	286	—	—	12	12
328	Haltwhistle - - -	235	203	—	—	20	12
329	Hexham - - -	1,015	845	4	—	115	51
330	Morpeth - - -	1,482	1,335	1	—	130	16
331	Newcastle-on-Tyne -	5,411	4,502	12	6	680	211
332	Rothbury - - -	206	187	—	—	12	7
333	Tynemouth - -	3,899	3,346	7	6	434	106
	NOTTINGHAM.						
334	Basford - - -	3,621	3,032	6		416	161
335	Bingham - - -	413	373	—	—	32	8
336	East Retford - -	737	662	—	—	68	7
337	Mansfield - - -	1,434	1,151	2	3	171	107
338	Newark - - -	933	801	—	—	92	40
339	Nottingham - -	3,053	2,142	11	2	410	488
340	Radford - - -	1,362	1,075	2	1	182	102
341	Southwell - - -	615	516	11	—	60	28
342	Worksop - - -	845	735	1	3	93	13
	OXFORD.						
343	Banbury - - -	1,012	715	2	—	93	202
344	Bicester - - -	454	369	5	—	56	24
345	Chipping Norton - -	618	549	—	—	61	8
346	Headington - -	719	564	—	—	74	81
347	Henley - - -	583	507	1	—	40	35
348	Oxford - - -	650	563	2	5	53	27
349	Thame - - -	479	432	—	—	40	7
350	Witney - - -	807	736	2	—	63	6
351	Woodstock - -	442	396	—	—	37	9

* No return for latter half of 1872 from Rothwell district.

App. No. 1.

Digest of Vaccination Returns.

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	RUTLAND.						
352	Oakham	330	292	1	-	33	4
353	Uppingham	365	327	-	—	31	7
	SALOP.						
354	Atcham	1,446	1,312	1	—	119	14
355	Bridgnorth	436	407	1	—	28	—
356	Church Stretton	185	166	—	—	15	4
357	Cleobury Mortimer	273	249	—	—	21	3
358	Clun	358	296	7	—	22	33
359	Drayton	451	407	—	1	38	5
360	Ellesmere	355	320	2	—	25	8
361	Ludlow	527	439	3	-	55	30
362	Madeley	1,149	1,028	6	—	103	12
363	Newport	467	402	—	—	39	26
364	Oswestry	833	757	—	—	68	8
365	Shiffnal	388	349	—	—	29	10
367	Wellington	940	851	—	4	74	11
368	Wem	295	268	—	—	22	5
368a	Whitchurch	367	299	—	—	60	8
	SOMERSET.						
369	Axbridge	1,115	994	—	—	88	33
370	Bath	1,889	1,579	4	1	185	120
371	Bedminster	2,162	1,827	—	1	226	108
372	Bridgwater	1,107	969	17	4	97	20
373	Chard	879	749	3	—	88	39
374	Clutton	803	731	1	—	60	11
375	Dulverton	190	131	9	—	15	35
376	Frome	732	626	1	—	65	40
377	Keynsham	811	722	—	—	61	28
378	Langport	501	455	—	—	29	17
379	Shepton Mallet	474	420	—	—	40	14
380	Taunton	1,031	878	5	1	81	66
381	Wellington	633	565	3	—	42	23
382	Wells	695	536	—	—	81	78
383	Williton	606	549	—	—	34	23
384	Wincanton	653	588	2	—	48	15
385	Yeovil	948	776	2	1	100	69
	SOUTHAMPTON.						
386	Alresford	309	287	1	—	11	10
387	Alton	520	462	1	—	29	28
388	Alverstoke	809	758	1	—	43	7
389	Andover	522	487	1	—	27	7
390	Basingstoke	542	481	—	—	27	34
391	Catherington	90	74	1	—	5	10
392	Christchurch	529	456	1	—	41	31
393	Droxford	347	314	—	—	19	14
394	Fareham	480	438	—	—	32	10
396	Fordingbridge	199	183	—	—	7	9
397	Hartley Wintney	598	531	4	—	48	15
398	Havant	219	177	—	—	16	26

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	SOUTHAMPTON—*cont.*						
399	Hursley - -	67	65	—	—	—	2
400	Kingsclere - - -	321	256	—	—	26	39
401	Lymington - - -	383	337	—	—	21	25
402	New Forest - -	388	345	—	1	37	5
403	Petersfield - - -	341	313	—	—	19	9
404	Portsea Island - -	3,906	3,461	7	35	342	61
405	Ringwood - - -	163	153	—	—	8	2
406	Romsey - - -	350	272	7	—	37	34
407	Southampton - -	1,651	1,239	5	1	198	208
408	S. Stoneham - -	1,115	942	—	—	91	82
409	Stockbridge - -	215	204	—	—	11	—
410	Whitchurch - -	168	144	—	—	15	9
411	Wight, I. of - -	1,997	1,756	10	2	129	100
412	Winchester - -	809	724	—	—	51	34
	STAFFORD.						
415	Wolstanton and Burslem -	2,183	2,773	3	—	349	58
416	Burton-on-Trent - -	2,155	1,490	1	2	182	480
417	Cheadle - - -	786	692	3	—	73	18
419	Leek - - -	1,110	841	—	—	96	173
420	Lichfield - - -	1,108	1,007	2	—	72	27
421	Newcastle-under-Lyme -	1,320	1,172	3	2	128	15
422	Penkridge - - -	993	836	—	2	108	47
423	Seisdon - - -	506	449	—	—	40	17
424	Stafford - - -	983	879	—	—	93	11
425	Stoke-on-Trent - -	3,976	3,425	3	1	437	110
426	Stone - - -	863	761	2	—	76	24
427	Tamworth - - -	611	445	—	—	45	121
428	Uttoxeter - - -	410	370	—	—	30	10
429	Walsall - - -	3,099	2,576	9	36	340	138
430	West Bromwich - -	4,788	4,271	7	13	422	75
431	Wolverhampton - -	5,147	4,553	13	15	502	64
	SUFFOLK.						
432	Blything - - -	894	750	1	—	86	57
433	Bosmere and Claydon -	518	444	1	—	41	32
434	Bury St. Edwunds - -	460	403	1	1	47	8
435	Cosford - - -	572	522	4	—	36	10
436	Hartismere - - -	532	468	—	—	49	15
437	Hoxne - - -	485	392	—	—	34	59
438	Ipswich - - -	1,490	1,348	1	7	118	16
439	Mildenhall - - -	297	263	3	—	30	1
440	Mutford and Lothingland -	1,121	840	3	3	122	153
441	Plomesgate - -	637	563	1	—	56	17
442	Risbridge - - -	661	596	3	—	54	8
443	Samford - - -	380	339	1	—	34	6
444	Stow - - -	744	656	—	—	64	24
445	Sudbury - - -	1,097	979	2	—	78	38
446	Thingoe - - -	553	496	—	—	43	14
447	Wangford - - -	465	390	—	—	49	26
448	Woodbridge - -	657	611	2	—	35	9

App. No. 1.

Digest of Vaccination Returns.

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Smallpox.	Dead, Unvaccinated.	Remaining.
	SURREY (extra metropolitan.)						
451	Chertsey - - -	733	622	—	1	46	64
452	Croydon - - -	2,923	2,367	7	1	258	290
453	Dorking - - -	497	460	—	—	30	7
454	Epsom - - -	927	765	3	—	52	107
455	Farnham - - -	1,513	1,303	2	1	129	78
457	Godstone - - -	412	378	—	—	27	7
458	Guildford - - -	1,007	861	—	—	74	72
459	Hambledon - -	457	398	—	—	19	40
460	Kingston - - -	976	828	3	—	57	88
464	Reigate - - -	909	835	1	—	59	14
465	Richmond - -	819	752	1	—	52	14
	SUSSEX.						
470	Battle - - -	447	391	—	—	38	18
471	Brighton - - -	2,801	2,080	3	—	354	364
472	Chailey - - -	278	254	—	—	18	6
473	Chichester - - -	245	173	—	—	22	50
474	Cuckfield - - -	681	578	2	—	53	48
475	Eastbourne - - -	523	431	—	—	39	53
476	East Grinstead - -	532	493	—	—	35	4
476a	East Preston - -	703	630	5	—	57	11
477	Hailsham - - -	427	363	1	—	26	37
478	Hastings - - -	1,129	943	2	—	112	72
479	Horsham - - -	637	532	1	—	47	57
480	Lewes - - -	349	307	2	—	29	11
481	Midhurst - - -	433	397	1	—	31	4
482	Newhaven - - -	206	163	2	—	18	23
483	Petworth - - -	294	254	—	—	28	12
484	Rye - - -	363	328	5	—	20	10
485	Steyning - - -	932	774	29	—	87	42
486	Thakeham - - -	285	263	—	—	18	4
487	Ticehurst - - -	605	524	—	—	52	29
488	Uckfield - - -	631	577	—	—	48	6
489	Westbourne - -	234	210	—	—	15	9
490	West Firle - - -	80	72	—	—	4	4
491	West Hampnett - -	575	473	7	—	46	49
	WARWICK.						
492	Alcester - - -	626	561	1	—	49	15
493	Aston - - -	6,794	5,976	2	5	642	169
494	Atherstone - - -	392	330	—	—	32	30
495	Birmingham - -	9,319	7,830	10	6	856	617
496	Coventry - - -	1,553	1,331	1	2	188	31
497	Foleshill - - -	661	540	—	—	84	37
498	Meriden - - -	323	285	2	—	22	14
499	Nuneaton - - -	480	377	—	1	57	45
500	Rugby - - -	758	686	—	—	49	23
501	Solihull - - -	416	382	—	—	22	12
502	Southam - - -	329	275	—	—	34	20
503	Stratford-on-Avon - -	710	629	—	—	51	30
504	Warwick - - -	1,407	1,232	1	—	139	35

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	WESTMORELAND.						
505	East Ward - - -	483	439	1	—	37	6
506	Kendal - - -	1,325	1,220	4	—	91	10
507	West Ward - -	254	231	—	—	22	1
	WILTSHIRE.						
508	Alderbury - - -	770	702	—	—	55	13
509	Amesbury - - -	241	222	—	—	17	2
510	Bradford - - -	311	293	—	—	15	3
511	Calne - - -	266	244	—	—	19	3
512	Chippenham - -	636	560	3	—	44	29
513	Cricklade and Wootton Bassett.	387	322	—	—	34	31
514	Devizes - - -	667	603	1	—	51	12
515	Highworth and Swindon -	1,060	931	1	—	87	41
516	Malmesbury - -	491	432	2	—	35	22
517	Marlborough - -	267	248	—	—	13	6
518	Melksham - - -	619	563	3	1	48	4
519	Mere - - -	275	257	—	—	16	2
520	Pewsey - - -	366	331	—	—	23	12
522	Tisbury - - -	201	181	—	—	12	8
523	Warminster - -	402	369	—	—	30	3
524	Westbury and Whorwelsdown.	376	341	—	—	28	7
525	Wilton - - -	335	274	—	—	20	41
	WORCESTER.						
526	Bromsgrove - -	1,012	909	2	—	91	10
527	Droitwich - - -	760	698	—	—	51	11
528	Dudley - - -	6,353	5,166	13	114	848	212
529	Evesham - - -	459	407	2	—	43	7
530	Kidderminster - -	1,228	1,002	1	—	96	129
531	King's Norton - -	2,388	2,143	4	2	159	80
532	Martley - - -	472	431	—	—	13	28
533	Pershore - - -	399	373	—	—	20	6
534	Shipston-on-Stour - -	630	499	4	—	68	59
535	Stourbridge - -	3,203	2,719	1	42	393	48
536	Tenbury - - -	224	194	—	—	14	16
537	Upton-on-Severn - -	630	591	4	—	27	8
538	Worcester - - -	965	802	2	12	129	20
	YORKSHIRE,						
	East Riding.						
539	Beverley - - -	685	579	2	1	77	26
540	Bridlington - - -	478	374	1	—	61	42
541	Driffield - - -	684	585	2	—	87	10
542	Howden - - -	431	384	2	—	42	3
542a	Kingston-upon-Hull -	2,612	2,200	4	3	329	76
543	Patrington - - -	264	226	—	—	31	7
544	Pocklington - -	511	410	2	—	69	30
545	Sculcoates - - -	2,782	2,337	4	1	331	109
546	Skirlaugh - - -	305	262	10	—	33	—
547	York - - -	2,125	1,830	6	2	220	67

App. No. 1.

Digest of Vaccination Returns.

—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
YORKSHIRE.						
North Riding.						
547a Aysgarth	142	130	—	—	7	5
548 Bedale	272	241	5	—	20	6
548a Easingwold	276	239	—	—	26	11
549 Guisborough	1,972	1,578	6	—	266	122
550 Helmsley Blackmoor	189	170	—	—	19	—
550a Kirkby Moorside	186	159	—	—	19	8
551 Leyburn	241	207	2	—	24	8
552 Malton	719	597	—	—	88	34
553 Northallerton	353	326	—	—	21	6
554 Pickering	483	395	1	—	53	36
555 Reeth	161	139	—	—	14	8
556 Richmond	381	338	—	—	32	11
557 Scarborough	1,212	1,017	6	—	153	36
558 Stokesley	348	322	—	—	20	6
559 Thirsk	389	352	1	—	31	5
560 Whitby	975	868	1	1	91	14
YORKSHIRE.						
West Riding.						
561 Barnsley	2,639	2,289	4	—	284	62
562 Bramley	1,938	1,615	—	—	232	91
563 Bradford	6,129	5,106	4	—	716	303
563a Bierley, N.	4,273	3,642	6	1	450	174
564 Dewsbury	5,279	4,256	1	3	643	376
565 Doncaster	1,496	1,268	6	3	183	36
566 Ecclesall Bierlow	3,502	2,973	6	5	367	151
567 Goole	611	530	3	—	60	18
568 Halifax	5,682	5,022	6	1	553	100
569 Hemsworth	225	207	5	—	12	1
569a Holbeck	965	846	—	—	109	10
570 Huddersfield	5,103	4,576	7	—	443	77
570a Hunslet	2,191	1,838	1	2	306	44
571 Keighley	2,014	1,590	10	—	239	175
572 Knaresborough	521	433	—	—	70	18
573 Leeds	6,707	5,779	5	5	835	83
574 Ouseburn, Great	356	304	1	—	27	24
575 Pateley Bridge	281	260	—	—	19	2
575a Penistone	560	489	—	1	54	16
576 Pontefract	1,453	1,257	1	4	152	39
577 Ripon	478	405	7	4	40	22
578 Rotherham	2,582	2,159	10	20	285	108
578a Saddleworth	728	642	1	—	69	16
579 Sedbergh	153	121	—	—	13	19
580 Selby	516	451	2	—	59	4
581 Settle	465	418	—	1	40	6
582 Sheffield	7,032	5,415	23	21	891	682
583 Skipton	1,025	816	2	—	109	98
584 Tadcaster	699	571	2	—	77	49
585 Thorne	547	390	1	—	67	89
586 Wakefield	2,848	2,455	2	2	303	86
586a Wetherby	451	394	2	—	34	21
586b Wharfedale	1,478	1,246	1	—	156	75
587 Wortley	1,196	942	2	—	124	128

—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
ANGLESEY.						
588 Anglesey - - -	423	362	5	—	40	16
588a Holyhead - - -	535	427	8	2	59	39
BRECKNOCK.						
589 Brecknock - - -	517	448	—	1	44	24
590 Builth - - -	243	206	2	—	20	15
591 Crickhowell - -	753	602	7	7	86	51
592 Hay - - -	302	257	—	—	25	20
CARDIGAN.						
593 Aberaeron - - -	386	326	—	1	28	31
594 Aberystwith - -	805	428	8	—	87	282
595 Cardigan - - -	466	399	—	—	38	59
596 Lampeter - - -	261	116	—	—	25	120
597 Tregaron - - -	320	112	—	—	23	155
CARMARTHEN.						
598 Carmarthen - -	1,077	965	1	—	78	33
599 Llanelly - - -	1,497	1,353	—	—	123	21
600 Llandilo Fawr - -	564	504	—	2	43	15
601 Llandovery - -	432	401	2	—	18	11
602 Newcastle-in-Emlyn -	545	494	1	—	34	16
CARNARVON.						
603 Bangor and Beaumaris -	1,029	903	4	—	99	23
604 Carnarvon - - -	1,344	1,178	4	—	131	31
605 Conway - - -	456	412	1	—	30	13
606 Pwllheli - - -	586	516	3	—	55	12
DENBIGH.						
607 Llanrwst - - -	358	272	—	—	38	48
608 Ruthin - - -	395	343	—	—	39	13
609 Wrexham - - -	1,903	1,660	—	1	192	50
FLINT.						
610 St. Asaph - - -	817	716	—	—	83	18
610a Hawarden - - -	503	460	—	—	41	2
611 Holywell - - -	1,457	1,262	2	2	146	45
GLAMORGAN.						
612 Bridgend and Cowbridge -	1,110	1,015	3	—	85	7
613 Cardiff - - -	2,751	2,460	4	6	179	102
613a Gower - - -	332	285	11	—	28	8
614 Merthyr Tydfil - -	4,219	3,724	6	53	396	40
615 Neath - - -	2,631	2,353	3	7	238	30
615a Pontypridd - - -	2,389	1,954	5	17	279	134
616 Swansea - - -	2,796	2,543	7	1	196	49

App. No. 1.

Digest of Vaccination Returns.

	—	Births.	Successfully Vaccinated.	Insusceptible of Vaccination.	Had Small-pox.	Dead, Unvaccinated.	Remaining.
	MERIONETH.						
617	Bala - - -	177	163	—	—	6	8
618	Corwen - - -	530	403	—	—	42	85
619	Dolgelly - - -	446	400	—	—	36	10
620	Festiniog - - -	947	511	—	—	111	325
	MONTGOMERY.						
621	Llanfyllin - - -	393	335	4	—	37	17
622	Machynlleth - -	404	330	—	—	39	35
623	Forden - - -	584	519	—	—	44	21
624	Newtown and Llanidloes -	857	534	1	1	105	216
	PEMBROKE.						
626	Haverfordwest - -	1,034	828	1	—	81	124
627	Narberth - - -	619	543	3	—	46	27
628	Pembroke - - -	997	884	—	—	75	38
	RADNOR.						
629	Knighton - - -	313	235	—	—	26	52
630	Presteigne - - -	117	100	5	—	6	6
631	Rhayader - - -	215	151	—	—	14	50

No. 2.

General Order of the Local Government Board under the Vaccination Act of 1874.

To the Guardians of the Poor of the several Unions in England and Wales ;—

To the Guardians of the Poor of the several Parishes, Townships, and Places in England and Wales under separate Boards of Guardians ;—

To the Vaccination Officers for the said Unions, Parishes, Townships, and Places, respectively ;—

And to all others whom it may concern.

Whereas by section 5 of "the Vaccination Act, 1871," it is provided as follows ;—

"Subject to the provisions of this Act, the Poor Law Board shall "have the same powers with respect to guardians and vaccination "officers in matters relating to vaccination as they have with "respect to guardians and officers of guardians in matters "relating to the relief of the poor, and may make rules, orders, "and regulations accordingly, and all enactments relating to such "powers, and to such orders, rules, and regulations, shall apply "mutatis mutandis ; and the Poor Law Board shall also from "time to time frame, provide, and distribute appropriate books "and forms for the use of vaccination officers, public vaccinators, "and medical practitioners, under the principal Act [the "Vaccination Act of 1867] and this Act."

And whereas by a general order bearing date the 23rd day of January 1872, addressed to the guardians of the poor of the several unions in England and Wales, and the guardians of the poor of the several parishes, townships, and places in England and Wales under separate boards of guardians, the Local Government Board prescribed regulations with respect to the appointment of vaccination officers by boards of guardians, and also as to the tenure of office, execution of duties, and remuneration of such officers :

And whereas by article 10 of the above-recited order the vaccination officers so appointed are required to duly observe and execute all instructions and directions issued or given to them from time to time by the Local Government Board ; and the Local Government Board, on the 21st day of December 1871, issued instructions to such officers under the hand of one of their secretaries :

And whereas by section 1 of "the Vaccination Act, 1874," it is enacted that the powers conferred by section 5 of "the Vaccination Act, 1871," shall be deemed to extend to and included the making of rules, orders, and regulations, prescribing the duties of guardians and their officers in relation to the institution and conduct of the proceedings to be taken for enforcing the provisions of the Vaccination Acts, 1867 and 1871, and the payment of the costs and expenses relating thereto ; and that rules, orders, and regulations under "the Vaccination Act, 1874," shall be deemed to be made under section 5 of the Vaccination Act, 1871 :

And whereas it is expedient that the above-recited order and instructions issued by the Local Government Board should be rescinded, and that the regulations herein-after contained should be substituted in lieu thereof :

App. No. 2.

General Order of Local Government Board under Vaccination Act, 1874.

Now, therefore, we, the Local Government Board, in pursuance of the powers given by the statutes in that behalf, hereby order as follows :—

The above-recited general order dated the 23rd day of January 1872, and the instructions above-recited, dated the 21st day of December 1871, shall be and are hereby rescinded ;

The following regulations shall henceforth be observed as regards the appointment of vaccination officers by boards of guardians, the tenure of office and the duties and remuneration of such officers, the institution and conduct of the proceedings to be taken for enforcing the provisions of the Vaccination Acts, and the payment of the costs and expenses relating thereto ; that is to say,—

I.—*Appointment of Vaccination Officers.*

Art. 1.—Where the guardians of any union or parish have not already appointed any vaccination officer under the provision of the Vaccination Acts, they shall do so forthwith.

Where the number of vaccination officers already appointed or hereafter appointed in any union or parish shall at any time, in the opinion of the guardians or of the Local Government Board, be insufficient for the purpose of securing the due execution of the Vaccination Acts in such union or parish, the guardians shall, in accordance with their own view or on the requisition of the Local Government Board, appoint a sufficient number of such officers.

Whenever, in consequence of an extensive outbreak of smallpox, or for other cause, it may appear to the guardians to be requisite to provide temporary assistance to any vaccination officer in the discharge of his duties, the guardians may, with the consent of the Local Government Board, appoint an assistant or assistants to the vaccination officer, for such time as the guardians may deem necessary.

Art. 2.—Every appointment of a vaccination officer, or assistant vaccination officer, hereafter made by the guardians, shall be made by a majority of the guardians voting on the question, and in the same manner as that in which the guardians are required to appoint other officers or assistants.

Art. 3.—Every such appointment shall, within seven days after it is made, be reported to the Local Government by the clerk to the guardians.

Art. 4.—In the event of a vacancy in the office of vaccination officer occurring at any time hereafter, the guardians shall report it to the Local Government Board, and shall make a fresh appointment without delay, unless the Local Government Board shall otherwise direct.

II.—*Tenure of Office of Vaccination Officers.*

Art. 5.—Every vaccination officer appointed under this order shall continue to hold the office until he die, or resign, or be removed by the guardians with the consent of the Local Government Board, or by the Local Government Board.

Art. 6.—Where a vaccination officer is appointed for a particular district, and any change in the extent of the district may be deemed necessary, and he shall decline to acquiesce therein, the guardians may, with the consent of the Local Government Board, but not otherwise, and after six months' notice in writing, signed by the clerk, given to such vaccination officer, determine his office.

Art. 7.—No person shall be appointed as a vaccination officer who does not agree to give one month's notice previous to resigning the office, or to forfeit such sum as may be agreed upon as liquidated damages.

Art. 8.—If any such officer give notice of an intended resignation to take effect on a future day, such resignation shall take effect on that day; and the guardians may elect a successor at any time subsequent to such notice.

III.—*Remuneration of Vaccination Officers.*

Art. 9.—The guardians shall pay to any vaccination officer such salary or remuneration, and such only, as the Local Government Board may direct or approve, whether for ordinary duties or for occasional services; and such salary or remuneration may be increased or reduced as that Board may from time to time direct or approve.

Art. 10.—The salary or remuneration of every such officer shall be payable up to the day on which he ceases to hold the office and no longer, subject to any deduction which the guardians may be entitled to make under Art. 7, and shall be considered as accruing from day to day, and be apportionable in respect of time accordingly, in pursuance of the provisions of "the Apportionment Act, 1870."

Art. 11.—The salary or remuneration assigned to such officer shall be payable quarterly, according to the usual feast days in the year, namely, Lady Day, Midsummer Day, Michaelmas Day, and Christmas Day; but the guardians may pay to him at the expiration of every calendar month such proportion as they may think fit on account of the salary or remuneration to which he may become entitled at the termination of the quarter.

Art. 12.—Every such officer shall make out his account at the end of each quarter, and within three days from the quarter day submit it to the guardians, together with the books which he may be required to keep, and the certificates in his possession; and until such account, books, and certificates have been so submitted, and until he has shown that the steps required of him by the instructions contained in the schedule to this order have been taken by him with respect to every case entered on the monthly lists furnished to him by the registrars of births and deaths, the guardians may postpone the payment of the balance of the salary or remuneration which may then remain due.

The vaccination officer shall also produce the said books and certificates to the guardians, when required by them to do so, at any other times than those above specified.

IV.—*Duties of Vaccination Officers.*

Art. 13.—No vaccination officer shall perform the duties of his office by deputy, unless, with the permission of the Local Government Board given on the application of the guardians, he shall be allowed to entrust their performance to some other person approved of by such guardians.

Art. 14.—Every vaccination officer in performing his duties under the Vaccination Acts shall obey all lawful orders of the guardians which are applicable to his office, and in conformity with the provisions of this order.

Art. 15.—The vaccination officer in performing the duties of his office shall duly observe the instructions contained in the schedule to this order.

V.—*Institution and Conduct of Proceedings.*

Art. 16.—The guardians shall, in all cases in which the provisions of the Vaccination Acts for enforcing vaccination have been neglected,

cause proceedings to be taken against the persons in default, and for this purpose shall give directions, authorizing the vaccination officer to institute and conduct such proceedings; but no such directions shall authorize the vaccination officer to take further proceedings under section 31 of the Vaccination Act of 1867 in any case in which an order has already been obtained and summary proceedings taken under that section, until he shall have brought the circumstances of the case under the notice of the guardians and received their special directions thereon.

Art. 17.—The vaccination officer shall take such proceedings as may be necessary under the Vaccination Acts, in any case in which the Local Government Board may direct him to do so.

VI.—*Costs of Proceedings.*

Art. 18.—The guardians shall pay the reasonable costs and expenses incurred by any vaccination officer appointed by them in any proceedings taken by him for enforcing the provisions of the Vaccination Acts, and shall charge the same in their accounts in the manner required by law, and the vaccination officer shall pay to the treasurer of the guardians, to their credit, all sums of money recovered or received by him from any defendants in respect of such costs or expenses, or in respect of any penalty under the said Acts.

VII.—*Interpretation.*

Art. 19.—The word "unions" in this order shall include not only unions of parishes formed under the provisions of "the Poor Law Amendment Act, 1834," but also unions of parishes incorporated or united for the relief or maintenance of the poor under any other Act of Parliament.

The Schedule above referred to.

1. The duties of the vaccination officer will be to act as registrar of vaccination for the district to which he is appointed; to see that all children resident therein are duly vaccinated; and generally to carry into effect, under direction of the guardians, but subject to the regulations contained in this order, all such provisions of the Vaccination Acts as are not expressly assigned to the execution of other officers.

2. He will receive from the registrars of births and deaths, and shall be responsible for the safe custody of, the "Monthly Lists" of births and deaths which will be sent to him under the provisions of the Act of 1871. On the lists of births he shall duly enter, in columns which are provided for the purpose, all certificates which he may receive of the successful vaccination of the children whose names are entered on the lists, or of their insusceptibility to vaccination, or of their having already had smallpox. All such entries must be made immediately on the receipt of the respective certificates. He shall compare each monthly list of deaths with the corresponding and with preceding lists of births, and as regards any children included in the death-return whose names are on the birth lists but for whom he has not received one of the certificates above referred to, he shall enter the death in the column provided. And when on his personal inquiries, or by information from the vaccination officer of another district, or on other reliable authority, he shall have ascertained that a child included in the birth lists for his district has died in some other district, he shall write off the case in like way. His work in these respects will be much facilitated by his keeping an alphabetical index to his birth lists.

3. He shall enter at the end of each quarter on blank "birth list" sheets which will be supplied him for the purpose on his applying to the district registrar, certificates which he may have received during the quarter, of the

successful vaccination, or insusceptibility to vaccination, of children whose births had not been registered at all, or whose district of birth registration he has been unable to ascertain.

4. The monthly lists of births, together with the supplemental sheets referred to in section 3, shall in the first instance be kept stitched, or otherwise fastened together, in a stiff cover, so as to preserve them from damage or dirt, and shall from time to time be bound into volumes as the guardians may direct, and shall constitute the "vaccination register" of the district.

5. If any list of births or deaths be not received from a registrar within one week from the time it is due, the vaccination officer shall report this to the guardians at the next board meeting, with a view to the registrar being immediately called upon for an explanation, and, if need be, to communication with the Local Government Board. A vaccination officer who shall lose any of these lists shall be bound to obtain another from the Registrar of Births and Deaths at his own cost.

6. The steps that the vaccination officer will be required to take in discharge of his duty to see that all children entered on the birth lists are duly vaccinated, will vary, according as the vaccination district in which the parent resides is one in which continuous weekly public vaccination is maintained, or one in which the public performance of vaccination is only periodical.

(i.) As regards districts in which there is continuous weekly public vaccination :—

(*a.*) He shall keep his birth lists examined from week to week, and in each case of default which may arise shall, *immediately on such default arising*, intimate the fact to the parent. For this purpose a notice in the annexed form A., or to the like effect, may be used; and such notice may, if he think fit, be sent by post. He should make a mark √ in the margin of his Vaccination register in each case in which this intimation of default has been given. If the intimation be not attended to within a reasonable time, say 15 days, or if in the case of a notice sent by post, the person to whom it was addressed has not been found by the post office, the vaccination officer shall at once proceed to make *personal* inquiries with a view to obtaining the requisite certificate or taking the necessary proceedings.

(*b.*) If on these personal inquiries the parent be found in default, an exact date should be specified by which he must have complied with the law; and a notice in the annexed form B., or to the like effect, should be given.

(*c.*) Failing compliance, the vaccination officer shall proceed according to the directions given him under Art. 16 of this order.

(ii.) As regards districts in which the public vaccination is periodical :—

(*a.*) He shall, *previous to each vaccination period*, examine his birth lists, and extract therefrom the names of all parents who would fall into default, provided their children were not vaccinated before the termination of the next ensuing attendances, in order that intimation to this effect may be given to such parents *a few days before the attendances commence*, with warning of the penalties which will result from non-compliance. The annexed Form C. or a form to the like effect, may be used for this purpose. He should make a mark √ in the margin of his vaccination register, against each case in which this intimation has been given.

(*b.*) And failing compliance, he shall without delay inquire personally into the circumstances of the case, and take such further steps as may be required according to the directions given him under Art. 16 of this order.

7. He shall keep a book to be called "The vaccination officer's report book," in such form as shall from time to time be framed and provided by the Local Government Board, in which he shall forthwith enter the names, with the other particulars required, of parents of whom personal inquiries may have been made, as above, with the dates of such inquiries. He shall note in this book any further action taken in any case, and make any remarks which the case calls for. He shall take care to make the necessary reference in column V. of his "vaccination register" to each case thus entered in the report book.

8. When on his inquiries the vaccination officer finds that a child has been successfully vaccinated, but the vaccination not duly certified, or that any other certificate due, as of postponement, &c., has not been transmitted, he shall ascertain with whom the default rests, having regard to the requirements

App. No. 2.

General Order of Local Government Board under Vaccination Act, 1874.

of the Vaccination Act, 1867, sections 21, 23, 30, and the Vaccination Act, 1871, section 7, and shall forthwith take the necessary steps for obtaining the certificate required.

9. He shall forthwith enter all certificates of postponement in the report book, with the date of the certificate, the name of the practitioner who signed it, and the period for which it was given, with a view to any inquiries which may be necessary at the expiration of that period; taking care to make the necessary reference in column V. of his "vaccination register" to each case so entered. When certificates of postponement are delivered to him on the form of "notice of requirement," he shall see that the parent is always supplied with a new form of the notice of requirement, with the particulars of attendance, &c., duly filled in. The forms of "notice of requirement" can be obtained by him on his applying to the district registrar.

10. When the vaccination officer shall find that any parent, respecting whose child he has not received a certificate of successful vaccination, has removed from the district, he shall take pains to ascertain the vaccination officer's district to which such removal has taken place, and shall give notice to the vaccination officer of that district, with a view to the vaccination of the child, and the due return of the certificate to himself. And whenever a certificate respecting a child whose birth was registered in the district of some other vaccination officer is sent to him, he shall take pains to ascertain the district in which the birth took place, and forward the certificate accordingly.

11. He shall submit to the guardians, in duplicate, at the end of every half year, a summary of the vaccinations of his district, in the form prescribed and issued half-yearly by the Local Government Board, the duplicate to be transmitted to the Local Government Board.

12. The vaccination officer shall at all times use his best endeavours to ascertain whether children resident in his district, but not having been born in it, or (if so born) not having had their births registered in it are unvaccinated, and shall, in such cases, take the requisite steps for procuring their vaccination.

13. He shall, on outbreaks of smallpox, make any house to house visitations which the Local Government Board or the guardians may direct in reference to vaccination, and carry out any special instructions they may issue on the subject.

14. As the guardians' officer for the administration of the Vaccination Acts, he shall see that the registrars of births and deaths in his district are kept informed of the arrangements for public vaccination as settled by the contracts, and of all alterations legally made in such arrangements, as well as of his own place of abode, in order that the entries required to be made in these respects by the registrars on the notices of requirement of vaccination delivered by them to parents may be correct. For this purpose it is recommended that the guardians have the particulars of the arrangements, and the name and address of the vaccination officer, printed in red ink on the notice forms with which each registrar is supplied.

15. He shall also see that public notifications of the arrangements for public vaccination are duly given; and in districts in which public vaccination is periodical, shall see that such notices are distributed and placarded through the districts a week or ten days before the commencement of each period.

16. He shall, as far as possible, attend the public vaccination stations during vaccinating hours, and report to the guardians any insufficiency of accommodation at these stations, or any failure of parents to bring for inspection the children on whom vaccination has been performed, or any other matter concerning the business of the station on which the guardians may require his report.

17. He shall also undertake the distribution of the certificates, books, and other forms issued by the Local Government Board, to the public vaccinators and medical practitioners in his district.

18. He shall be responsible for the safe custody of the "registers of successful vaccinations" which were kept by the registrars of births and deaths under the Acts of 1853 and 1867. The registers kept under the Act of 1853 may, if the guardians permit, be deposited in the union offices; but all registers which contain entries of births subsequent to December 31, 1867, must be retained

by the vaccination officer. He shall duly and forthwith enter in these registers the certificates which he may receive or obtain of the successful vaccination of children whose births are therein recorded. He shall write the word "dead" against the names of any of the children whose births are entered in these registers, whom he may ascertain either by the monthly death-lists, or by his own inquiries, to have died without having been vaccinated. And he shall write, *in pencil*, against the respective names, any information (as of removal from district, certificate of postponement, and its date, &c.) which does not finally dispose of the case.

FORM A.

VACCINATION ACTS, 1867 & 1871.

*To*_____

I hereby remind you that I have not received the certificate now due respecting the vaccination of your child,_____ and I beg that you will take the steps necessary to have such certificate forwarded to me without delay,_____

(Signed)

Vaccination Officer for

_____

*Dated*_____

*Address of Vaccination Officer*_____

*** The public vaccinator for your district attends at his station at_____

_____

for the gratuitous performance of vaccination every_____ at_____o'clock. If the child be vaccinated there, the public vaccinator is responsible for the transmission of the certificate to me, otherwise it devolves UPON YOURSELF to send me the certificate.

FORM B.

VACCINATION ACTS, 1867 & 1871.

*To*_____

Whereas you are in default under the above Acts, respecting your child,

_____

I hereby require you [to have the said child vaccinated within fourteen days from the date hereof, and do all other things the law requires touching the said vaccination*], *or* [to transmit to me within seven days from the date hereof the requisite certificate concerning the vaccination of the said child*], failing which it will be my duty to take the proper steps for securing the enforcement of the law.

(Signed)

Vaccination Officer for

_____

*Address of Vaccination Officer*_____

*** The public vaccinator for your district attends at his station at_____

_____

for the gratuitous performance of vaccination every_____ at_____o'clock. If the child be vaccinated there, the public vaccinator is responsible for the transmission of the certificate to me, otherwise it devolves UPON YOURSELF to send me the certificate.

App. No. 2.

General Order of Local Government Board under Vaccination Act, 1874.

Form C.

VACCINATION ACTS, 1867 & 1871.

*To*_____

I hereby remind you that the next appointed periodical attendance for the performance of public vaccination in your district will take place at_____ on_____,

and that if your child,_____ be not vaccinated before the expiration of that period, you will be in default, and subject to the penalties of the Vaccination Acts; and that it will be my duty to take the proper steps for securing the enforcement of the law.

(Signed)

Vaccination Officer for

_____

Dated _____

Address of Vaccination Officer _____

Given under the Seal of Office of the Local Government Board, this thirty-first day of October in the year one thousand eight hundred and seventy-four.

G. Sclater-Booth, *President.*

John Lambert, *Secretary.*

No. 3.

List (alphabetically arranged) of 275 Unions inspected during the Year 1874, with reference to their Proceedings under the Vaccination Acts, 1867 and 1871, and an Account of the Awards made to the respective Public Vaccinators out of Moneys voted by Parliament for that Purpose.

Union.	No. of Vaccination Districts in Union.	No. of respective Vaccination Contractors recommended for Awards.		Range of Awards in each Union.		Total Sum awarded in the Union.	Name of Inspector.
		1st Class Awards.	2nd Class Awards.	Minimum.	Maximum.		
				£ s. d.	£ s. d.	£ s. d.	
Abergavenny	3	1	—	—	—	7 9 0	Dr. Thorne.
Abingdon	4	2	—	5 6 0	13 12 0	18 18 0	„ Stevens.
Albans, St.	4	2	—	15 14 0	19 7 0	35 1 0	„ Thorne.
Alnwick	7	—	2	1 12 0	8 7 4	9 19 4	„ Airy.
Alresford	2	—	—	—	—	—	„ Stevens.
Alston-in-Garrigill	2	1	—	—	—	8 11 0	„ Airy.
Alton	4	2	1	5 2 8	12 1 0	24 7 8	„ Stevens.
Altrincham	6	—	—	—	—	—	„ Beard.
Alverstoke	1	—	1	—	—	24 6 0	„ Stevens.
Ampthill	4	3	—	8 13 0	11 19 0	29 8 0	„ Thorne.
Andover	6	3	—	1 14 0	10 17 0	19 3 0	„ Stevens.
Ashbourne	7	—	—	—	—	—	„ Beard.
Ashby-de-la-Zouch	6	4	—	11 9 0	17 6 0	54 17 0	„ Ballard.
Austell, St.	7	2	—	10 0 0	10 14 0	20 14 0	„ Blaxall.
Axminster	10	2	—	5 17 0	8 8 0	14 5 0	Do.
Aylsham	7	2	—	4 11 0	7 2 0	11 13 0	„ Airy.
Bakewell	8	2	—	4 8 0	5 5 0	9 13 0	„ Beard.
Barnet	5	1	1	5 17 0	5 17 4	11 14 4	„ Thorne.
Barnstaple	10	3	1	2 4 0	9 8 0	26 1 0	„ Blaxall.
Barrow-on-Soar	5	1	1	2 16 8	9 12 0	12 8 8	„ Ballard.
Basford	3	4	—	8 12 0	43 7 0	100 5 0	„ Beard.
Basingstoke	6	3	1	2 2 0	12 17 0	30 15 0	„ Stevens.
Battle	6	—	1	—	—	6 18 8	Do.
Bedford	8	5	—	6 15 0	9 11 0	43 2 0	„ Thorne.
Bedwellty	5	5	—	10 15 0	61 17 0	175 16 0	Do.
Belford	2	1	—	—	—	6 12 0	„ Airy.
Bellingham	6	—	—	—	—	—	Do.
Belper	9	3	—	7 3 0	26 17 0	44 5 0	„ Beard.
Berkhampstead	3	2	—	9 10 0	10 1 0	19 11 0	„ Thorne.
Berwick-on-Tweed	5	1	2	1 18 8	3 19 4	8 0 0	„ Airy.
Bethnal Green	2	—	—	—	—	—	„ Stevens.
Beverley	5	3	—	3 9 0	4 11 0	11 15 0	„ Beard.
Bideford	7	2	—	0 12 0	4 5 0	4 17 0	„ Blaxall.
Biggleswade	6	3	—	14 3 0	24 11 0	61 1 0	„ Thorne.
Billesdon	3	1	1	2 7 4	6 2 0	8 9 4	„ Ballard.
Bingham	4	2	—	6 3 0	7 9 0	13 12 0	„ Beard.
Birkenhead	3	2	—	22 9 0	66 11 0	89 0 0	Do.
Birmingham	1	1	—	—	—	262 5 0	„ Seaton.
Bishops Stortford	7	4	—	1 8 0	14 2 0	25 18 0	„ Thorne.
Blaby	3	—	—	—	—	—	„ Ballard.
Blofield	3	3	—	2 0 0	11 16 0	22 10 0	„ Airy.
Bodmin	7	2	—	2 10 0	2 17 0	5 7 0	„ Blaxall.
Bootle	3	1	1	1 19 4	4 8 0	6 7 4	„ Airy.
Boston	8	—	—	—	—	—	„ Beard.
Bourn	7	3	—	4 3 0	7 11 0	17 6 0	Do.
Brackley	5	—	1	—	—	3 11 4	„ Thorne.
Bradfield	6	3	2	3 6 0	8 18 0	29 11 0	„ Stevens.
Brampton	1	—	Under consideration.			—	„ Airy.
Bridlington	4	—	1	—	—	2 0 8	„ Beard.
Bristol	1	1	—	—	—	69 8 0	„ Seaton.
Buntingford	2	2	—	5 1 0	7 10 0	12 11 0	„ Thorne.
Bury St. Edmunds	1	1	—	—	—	28 12 0	„ Airy.
Caistor	10	6	—	1 7 0	6 10 0	22 5 0	„ Beard.
Camberwell	5	—	—	—	—	—	„ Stevens.
Camelford	2	—	—	—	—	—	„ Blaxall.
Carlisle	5	3	—	2 4 0	7 6 0	16 8 0	„ Airy.
Castle Ward	6	1	1	2 14 8	9 7 0	12 1 8	Do.
Catherington	1	1	—	—	—	3 15 0	„ Stevens.
Chapel-en-le-Frith	3	2	—	4 11 0	16 19 0	21 10 0	„ Beard.
Cheltenham	3	1	—	—	—	4 6 0	„ Ballard.
Chepstow	5	2	—	4 10 0	11 15 0	16 5 0	„ Thorne.
Chertsey	5	4	1	4 10 8	11 8 0	38 11 8	„ Stevens.
Chester	3	2	—	12 16 0	55 5 0	68 1 0	„ Beard.

App. No. 3.

Inspection of Public Vaccination.

Union.	No. of Vaccination Districts in Union.	No. of respective Vaccination Contractors recommended for Awards.		Range of Awards in each Union.		Total Sum awarded in the Union.	Name of Inspector.
		1st Class Awards.	2nd Class Awards.	Minimum.	Maximum.		
				£ s. d.	£ s. d.	£ s. d.	
Chesterfield	11	6	1	4 5 0	18 10 0	87 17 8	Dr. Beard.
Chipping Sodbury	5	1	—	—	—	10 3 0	„ Ballard.
Christchurch	2	1	—	—	—	21 15 0	„ Stevens.
Cirencester	4	2	1	6 15 4	22 7 0	39 10 4	„ Ballard.
Clifton	6	6	—	6 10 0	85 15 0	203 11 0	Do.
Cockermouth	5	2	—	12 15 0	14 7 0	27 2 0	„ Airy.
Columb, St. Major	6	1	—	—	—	8 7 0	„ Blaxall.
Congleton	4	3	—	6 3 0	34 6 0	65 4 0	„ Beard.
Cookham	4	1	—	—	—	10 16 0	„ Stevens.
Coventry	1	1	—	—	—	91 10 0	„ Seaton.
Crediton	9	5	—	1 12 0	6 0 0	19 8 0	„ Blaxall.
Croydon	7	4	1	1 14 0	33 15 0	67 0 0	„ Stevens.
Depwade	7	3	—	4 17 0	8 18 0	19 16 0	„ Airy.
Derby	2	1	—	—	—	70 6 0	„ Beard.
Dewsbury	11	5	—	17 17 0	21 17 0	98 13 0	Do.
Docking	4	—	—	—	—	—	„ Airy.
Doncaster	7	1	—	—	—	5 8 0	„ Beard.
Dorking	4	3	—	1 6 0	5 8 0	8 0 0	„ Stevens.
Downham	6	1	—	—	—	10 12 0	„ Airy.
Driffield	8	2	—	4 2 0	4 5 0	8 7 0	„ Beard.
Droxford	4	1	—	—	—	5 7 0	„ Stevens.
Dursley	3	—	—	—	—	—	„ Ballard.
Eastbourne	4	—	—	—	—	—	„ Stevens.
East Hampstead	4	3	—	3 15 0	7 0 0	16 16 0	Do.
East Retford	7	6	—	0 14 0	13 12 0	43 9 0	„ Beard.
East Stonehouse	1	1	—	—	—	22 18 0	„ Blaxall.
East Ward	6	3	—	2 19 0	8 18 0	15 19 0	„ Airy.
Epsom	8	2	—	2 8 0	4 6 0	6 14 0	„ Stevens.
Erpingham	3	—	—	—	—	—	„ Airy.
Exeter	1	1	—	—	—	44 15 0	„ Seaton.
Faith, St.	5	—	1	—	—	1 6 8	„ Airy.
Falmouth	4	1	—	—	—	9 16 0	„ Blaxall.
Fareham	5	3	—	3 15 0	11 1 0	21 19 0	„ Stevens.
Farnham	7	3	1	0 17 4	15 11 0	31 13 4	Do.
Faringdon	4	1	2	2 12 0	7 2 0	14 19 0	Do.
Flegg, E. and W.	4	1	—	—	—	5 5 0	„ Airy.
Fordingbridge	2	2	—	8 2 0	8 11 0	16 13 0	„ Stevens.
Forehoe	6	1	—	—	—	8 15 0	„ Airy.
Freebridge Lynn	5	—	—	—	—	—	Do.
Fulham	3	3	—	19 17 0	24 14 0	66 16 0	„ Stevens.
Gainsborough	8	5	—	2 19 0	16 14 0	31 15 0	„ Beard.
Gateshead	6	1	—	—	—	31 7 0	„ Airy.
Georges, St.	4	4	—	3 9 0	100 2 0	165 10 0	„ Stevens.
Germans, St.	6	—	—	—	—	—	„ Blaxall.
Giles, St., and St. George.	1	1	—	—	—	29 3 0	„ Stevens.
Glanford Brigg	9	8	—	4 8 0	12 12 0	60 19 0	„ Beard.
Glendale	6	1	1	2 8 0	4 12 0	7 0 0	„ Airy.
Glossop	2	2	—	3 15 0	21 10 0	25 5 0	„ Beard.
Gloucester	2	—	—	—	—	—	„ Ballard.
Godstone	5	3	—	3 3 0	8 18 0	18 11 0	„ Stevens.
Grantham	7	2	—	5 13 0	6 9 0	12 2 0	„ Beard.
Greenwich	2	2	—	50 3 0	114 10 0	164 13 0	„ Stevens.
Guildford	9	6	—	3 3 0	14 6 0	40 11 0	Do.
Guiltcross	5	2	—	2 10 0	5 1 0	7 11 0	„ Airy.
Hailsham	6	1	1	2 8 0	7 6 0	9 14 0	„ Stevens.
Haltwhistle	4	1	—	—	—	13 0 0	„ Airy.
Hambledon	5	3	1	4 8 0	5 14 0	21 0 0	„ Stevens.
Hampstead	1	1	—	—	—	11 12 0	Do.
Hartley Wintney	6	2	1	2 14 8	8 0 0	17 5 8	Do.
Hastings	2	2	—	2 0 0	33 18 0	35 18 0	Do.
Hatfield	3	—	—	—	—	—	„ Thorne.
Havant	3	2	—	2 3 0	3 11 0	5 14 0	„ Stevens.
Hayfield	1	1	—	—	—	17 1 0	„ Beard.
Helston	4	—	—	—	—	—	„ Blaxall.
Hemel Hempstead	4	—	—	—	—	—	„ Thorne.
Henstead	4	—	—	—	—	—	„ Airy.
Hertford	5	2	1	3 8 8	11 3 0	20 13 8	„ Thorne.
Hexham	11	3	—	4 13 0	5 1 0	14 13 0	„ Airy.
Hinckley	5	3	—	2 13 0	21 12 0	27 0 0	„ Ballard.

Union.	No. of Vacciantion Districts in Union.	No. of respective Vaccination Contractors recommended for Awards.		Range of Awards in each Union.		Total Sum awarded in the Union.	Name of Inspector.
		1st Class Awards.	2nd Class Awards.	Minimum.	Maximum.		
				£ s. d.	£ s. d.	£ s. d.	
Hitchin	5	1	1	7 4 0	10 19 0	18 3 0	Dr. Thorne.
Holbeach	6	2	2	4 3 0	11 16 0	28 8 4	„ Beard.
Holborn	4	4	—	41 2 0	64 10 0	194 16 0	„ Stevens.
Holsworthy	5	—	1	—	—	2 18 0	„ Blaxall.
Honiton	7	3	—	1 1 0	9 5 0	13 16 0	Do.
Horncastle	6	—	—	—	—	—	„ Beard.
Howden	4	1	—	—	—	12 9 0	Do.
Hungerford	5	1	—	—	—	7 18 0	„ Stevens.
Huntingdon	5	2	—	8 17 0	21 18 0	30 15 0	Do.
Hursley	1	1	—	—	—	6 10 0	Do.
Ives, St.	5	4	—	10 3 0	13 0 0	47 1 0	Do.
Kendal	8	2	—	5 0 0	7 15 0	12 15 0	„ Airy.
Kensington	3	2	—	34 9 0	86 5 0	120 14 0	„ Stevens.
Kingsbridge	8	—	—	—	—	—	„ Blaxall.
Kingsclere	3	—	—	—	—	—	„ Stevens.
King's Lynn	1	1	—	—	—	26 5 0	„ Airy.
Kingston-on-Hull	2	1	—	—	—	34 10 0	„ Beard.
Kingston-on-Thames	11	—	1	—	—	1 4 8	„ Stevens.
Launceston	8	3	—	4 13 0	7 10 0	18 7 0	„ Blaxall.
Leicester	2	2	—	76 13 0	130 9 0	207 2 0	„ Ballard.
Leighton Buzzard	2	1	—	—	—	1 19 0	„ Thorne.
Lincoln	11	6	—	1 16 0	15 12 0	37 16 0	„ Beard.
Liskeard	7	2	—	4 11 0	12 3 0	16 14 0	„ Blaxall.
Loddon and Clavering	4	1	—	—	—	7 11 0	„ Airy.
Longtown	2	—	—	—	—	—	Do.
Loughborough	4	3	—	5 0 0	19 9 0	42 18 0	„ Ballard.
Louth	11	7	—	4 10 0	18 1 0	54 8 0	„ Beard.
Luton	6	3	2	0 14 8	10 17 0	33 8 0	„ Thorne.
Lutterworth	5	4	—	4 5 0	6 19 0	21 7 0	„ Ballard.
Lymington	4	2	—	1 8 0	7 3 0	8 11 0	„ Stevens.
Macclesfield	6	3	—	4 15 0	40 10 0	64 18 0	„ Beard.
Mansfield	6	1	1	5 7 4	8 18 0	14 5 4	Do.
Market Bosworth	6	—	—	—	—	—	„ Ballard.
Market Harborough	5	3	—	5 15 0	14 9 0	30 11 0	Do.
Melton Mowbray	6	1	—	—	—	4 8 0	Do.
Mildenhall	2	—	—	—	—	—	„ Airy.
Mitford and Launditch.	8	2	—	7 9 0	7 18 0	15 7 0	Do.
Monmouth	6	2	—	4 17 0	36 17 0	41 14 0	„ Thorne.
Morpeth	9	—	2	3 8 0	8 11 4	11 19 4	„ Airy.
Nantwich	8	2	1	4 13 0	11 2 8	22 17 8	„ Beard.
Newark	10	7	—	1 15 0	5 5 0	22 13 0	Do.
Newbury	3	—	—	—	—	—	„ Stevens.
Newent	3	2	—	6 15 0	12 4 0	18 19 0	„ Ballard.
New Forest	5	2	—	4 18 0	7 10 0	12 8 0	„ Stevens.
Newport, Mon.	7	3	1	9 11 0	26 3 0	59 13 4	„ Thorne.
Newton Abbo	11	3	—	3 14 0	35 12 0	48 15 0	„ Blaxall.
Northleach	5	3	1	1 16 8	8 0 0	20 10 8	„ Ballard.
Northwich	7	6	—	2 3 0	27 9 0	98 6 0	„ Beard.
Norwich	1	1	—	—	—	66 5 0	„ Airy.
Nottingham	2	—	—	—	—	—	„ Beard.
Oakham	3	2	1	4 8 8	21 1 0	32 1 8	„ Stevens.
Okehampton	6	—	—	—	—	—	„ Blaxall.
Olave, St.	3	2	—	36 6 0	64 12 0	100 18 0	„ Stevens.
Paddington	2	2	—	15 12 0	16 19 0	32 11 0	Do.
Patrington	5	2	—	3 17 0	4 2 0	7 19 0	„ Beard.
Penrith	6	4	—	4 15 0	15 6 0	32 16 0	„ Airy.
Penzance	5	2	—	8 11 0	17 10 0	26 1 0	„ Blaxall.
Petersfield	4	2	—	4 4 0	5 13 0	9 17 0	„ Stevens.
Plymouth	2	2	—	26 11 0	30 6 0	56 17 0	„ Blaxall.
Plympton St. Mary	5	2	—	8 3 0	10 18 0	19 1 0	Do.
Pocklington	6	—	—	—	—	—	„ Beard.
Pontypool	3	1	—	—	—	41 13 0	„ Thorne.
Poplar	4	4	—	32 12 0	57 0 0	159 15 0	„ Stevens.
Portsea Island	3	1	1	40 12 0	85 14 0	126 6 0	Do.

App. No. 3.

Inspection of Public Vaccination.

Union.	No. of Vaccination Districts in Union.	No. of respective Vaccination Contractors recommended for Awards.		Range of Awards in each Union.		Total Sum awarded in the Union.	Name of Inspector.
		1st Class Awards.	2nd Class Awards.	Minimum.	Maximum.		
				£ s. d.	£ s. d.	£ s. d.	
Radford	2	—	—	—	—	—	Dr. Beard.
Reading	1	1	—	—	—	48 14 0	„ Stevens.
Redruth	6	1	4	4 16 0	14 17 4	45 13 8	„ Blaxall.
Reigate	4	—	—	—	—	—	„ Stevens.
Richmond (Surrey)	3	3	—	7 1 0	15 6 0	29 15 0	Do.
Ringwood	1	1	—	—	—	12 16 0	Do.
Risbridge	5	2	—	6 9 0	19 13 0	26 2 0	„ Airy.
Romsey	5	1	—	—	—	1 3 0	„ Stevens.
Rothbury	6	—	—	—	—	—	„ Airy.
Rotherham	8	3	—	2 13 0	8 6 0	16 15 0	„ Beard.
Royston	6	1	—	—	—	7 9 0	„ Thorne.
Runcorn	4	2	—	12 7 0	28 19 0	41 6 0	„ Beard.
Rye	3	—	—	—	—	—	„ Stevens.
Saviour, St.	5	4	—	10 3 0	64 6 0	164 5 0	Do.
Sculcoats	7	3	—	7 5 0	29 11 0	47 1 0	„ Beard.
Shardlow	8	2	—	10 3 0	14 19 0	25 2 0	„ Do.
Sheffield	6	2	1	36 11 4	70 10 0	150 4 4	„ Seaton.
Shoreditch	3	3	—	35 10 0	87 16 0	203 0 0	„ Stevens.
Skirlaugh	6	3	—	0 10 0	3 19 0	7 1 0	„ Beard.
Sleaford	6	5	—	4 5 0	13 15 0	38 11 0	Do.
Smallburgh	4	2	—	8 5 0	8 11 0	16 16 0	„ Airy.
Southampton	2	2	—	14 1 0	15 17 0	29 18 0	„ Stevens.
South Molton	9	1	1	1 3 4	8 11 0	9 14 4	„ Blaxall.
South Stoneham	5	3	—	2 19 0	10 11 0	19 8 0	„ Stevens.
Southwell	9	2	—	5 17 0	7 19 0	13 16 0	„ Beard.
Spalding	11	—	—	—	—	—	Do.
Spilsby	7	—	—	—	—	—	Do.
Staines	7	—	—	—	—	—	„ Thorne.
Stamford	7	4	—	0 10 0	9 13 0	20 16 0	„ Beard.
Stepney	2	1	—	—	—	39 14 0	„ Stevens.
Stockbridge	2	2	—	8 2 0	9 1 0	17 3 0	„ Do.
Stockport	5	4	1	11 10 0	59 15 0	165 17 4	„ Beard.
Stoke Damerel	2	1	—	—	—	41 12 0	„ Blaxall.
Stow-on-the-Wold	3	1	—	—	—	7 15 0	„ Ballard.
Strand	1	1	—	—	—	40 13 0	„ Stevens.
Stratton	2	—	—	—	—	—	„ Blaxall.
Stroud	6	4	—	9 13 0	26 11 0	62 13 0	„ Ballard.
Swaffham	6	—	—	—	—	—	„ Airy.
Tarvin	2	2	—	9 1 0	12 19 0	22 0 0	„ Beard.
Tavistock	7	—	—	—	—	—	„ Blaxall.
Tetbury	2	2	—	3 8 0	7 9 0	10 17 0	„ Ballard.
Tewkesbury	4	2	—	6 11 0	6 18 0	13 9 0	„ Do.
Thetford	8	2	—	1 11 0	5 19 0	7 10 0	„ Airy.
Thingoe	8	2	2	1 18 0	11 6 0	23 3 0	„ Do.
Thomas, St.	15	5	1	1 11 4	10 3 0	26 1 4	„ Blaxall.
Thornbury	4	2	1	7 14 0	15 1 0	34 1 0	„ Ballard.
Tiverton	11	3	1	1 3 0	6 7 4	13 2 4	„ Blaxall.
Torrington	5	—	—	—	—	—	Do.
Totnes	11	1	1	2 15 0	15 11 4	18 6 4	Do.
Truro	7	—	—	—	—	—	Do.
Tynemouth	7	6	1	12 11 0	41 5 0	183 18 0	„ Airy.
Uckfield	6	2	2	5 6 0	12 18 0	34 14 0	„ Stevens.
Ulverstone	8	1	1	25 10 0	51 5 4	76 15 4	„ Airy.
Uppingham	4	4	—	4 17 0	10 7 0	30 15 0	„ Stevens.
Wallingford	3	3	—	10 17 0	13 10 0	36 5 0	„ Do.
Walsingham	6	2	2	2 3 0	7 5 0	15 16 0	„ Airy.
Wantage	5	—	—	—	—	—	„ Stevens.
Ware	8	3	1	0 12 8	11 0 0	20 12 8	„ Thorne.
Watford	5	2	—	8 8 0	9 10 0	17 18 0	Do.
Wayland	1	—	—	—	—	—	„ Airy.
Welwyn	1	1	—	—	—	5 4 0	„ Thorne.
Westbury-on-Severn	4	2	—	19 16 0	26 12 0	46 8 0	„ Ballard.
Westminster	2	2	—	9 15 0	17 13 0	27 8 0	„ Stevens.
West Ward	4	1	—	—	—	8 11 0	„ Airy.
Wheatenhurst	2	2	—	6 1 0	8 13 0	14 14 0	„ Ballard.
Whitchurch (Hants)	3	—	—	—	—	—	„ Stevens.
Whitechapel	1	1	—	—	—	65 7 0	Do.
Whitehaven	6	1	—	—	—	4 8 0	„ Airy.
Wight, Isle of	9	3	—	3 3 0	12 3 0	20 1 0	„ Stevens.

Union.	No. of Vaccination Districts in Union.	No. of respective Vaccination Contractors recommended for Awards.		Range of Awards in each Union.		Total Sum awarded in the Union.	Name of Inspector.
		1st Class Awards.	2nd Class Awards.	Minimum.	Maximum.		
				£ s. d.	£ s. d.	£ s. d.	
Wigton - - -	7	1	1	4 9 0	7 0 8	11 9 8	Dr. Airy.
Winchcomb - -	2	—	—	—	—	—	„ Ballard.
Winchester - -	4	2	—	4 17 0	6 14 0	11 11 0	„ Stevens.
Windsor - - -	3	3	—	6 6 0	25 13 0	48 15 0	Do.
Wirrall - - -	4	4	—	6 3 0	15 19 0	39 17 0	„ Thorne.
Woburn - - -	4	1	—	—	—	5 0 0	Do.
Wokingham - -	4	3	—	6 10 0	23 19 0	38 3 0	„ Stevens.
Worksop - - -	7	4	1	2 4 8	21 11 0	36 16 8	„ Beard.
Yarmouth, Gt. - -	1	1	—	—	—	24 0 0	„ Airy.
York - - - -	6	2	—	3 5 0	4 12 0	7 17 0	„ Beard.
Total -	1,357	519	68	—	—	8,204 2 0	

Supplementary List of Awards made in 1874 to Public Vaccinators in Unions which were inspected in 1873.

				£ s. d.	£ s. d.	£ s. d.	
Bangor - - -	5	2	1	5 14 8	26 7 0	39 13 8	
Chorley - - -	5	3	—	11 0 0	17 13 0	39 15 0	
Cuckfield - - -	6	5	1	2 8 0	9 9 0	40 11 4	
Pontefract - - -	7	5	—	2 8 0	10 15 0	35 15 0	
Tarvin - - -	2	1	—	—	—	17 1 0	
Total -	25	16	2	—	—	172 16 0	

No. 4.

App. No. 4.

National Vaccine Establishment.

Statistics of the National Vaccine Establishment and Educational Vaccinating Stations.

I.—Staff at end of 1874.

N.B.—The stations named in *italics* are Educational Vaccinating Stations, authorized by the Local Government Board.

—	Name.	Vaccinating Stations.	Days and Hours of Attendance.
Vaccinators supplying lymph for the public service, & salaried from the Parliamentary grant -	1. Mr. J. F. Marson -	*Surrey Chapel* -	Tues., Thurs.; 1.
	2. Mr. G. L. Cooper -	Great Northern Hospital.	Tuesday; 12.
	3. Mr. W. E. G. Pearse -	*Tottenham Court Chapel.*	Mon., Wednes.; 1.
Parochial and other Vaccinators not salaried from the Parliamentary grant, but contributing lymph at a fixed rate of payment.	1. Mr. Ellis S. Guest -	*Manchester* -	Monday; 2.
	2–5. Dr. Edmund Robinson.	*Birmingham*	2. Monday - 3. Tuesday - 4. Wednesday 5. Thursday - 11.
	6. Dr. H. A. P. Robertson	*Bristol* - -	Wednesday; 10.
	7. Mr. A. B. Steele - -	*Liverpool* - -	Thursday; 2.
	8. Mr. E. L. Webb - -	*Pimlico* - -	Thursday; 10.
	9. Dr. T. C. Nesham -	*Newcastle-on-Tyne.*	Thursday; 3.
	10. Mr. W. E. G. Pearse -	*Westminster* -	Tuesday; 2.
	11–12. Mr. W. A. Summer.	*Marylebone*	Monday - Wednesday 10.
	13. Mr. C. T. Blackman -	*Whitechapel* -	Wednesday; 11.
	14. Mr. Frederick Holmes -	*Leeds* - -	Tuesday; 2.30.
	15. Dr. Edward Lynes -	Coventry -	Tuesday; 12.
	16. Dr. Hugh Thomson -	*Glasgow* - -	Monday; 12.
	17. Mr. C. Harriot Roper -	*Exeter* - -	Thursday; 3.
	18. Mr. Robert W. Dunn -	*Strand* - -	Thursday; 11.
	19. Dr. Matthew Brownfield	Bromley, Middlesex.	Tuesday; 3.
	20. Mr. John Broadbent -	Ancoats - -	Wednesday; 2.
	21. Mr. W. Skinner - -	*Sheffield* - -	Tuesday; 3.
	22. Dr. A. C. Clarke - -	Salford - -	Thursday; 2.
	23. Mr. N. Miskin - -	Waterloo - -	Tuesday; 2.
	24. Mr. T. F. Morrish -	Toxteth Park -	Tuesday; 11.
Teachers of Vaccination not supplying lymph -	Dr. W. Husband - -	*Edinburgh* -	Wednes., Sat.; 12.
	Dr. R. D. Tannahill -	*Glasgow* - -	Mond., Thurs.; 12.

II.—Sources and Amount of Lymph Supply in 1874.

App. No. 4.

National Vaccine Establishment.

N.B.—The stations named in *italics* are Educational Vaccinating Stations, authorized by the Local Government Board.

—	Vaccinating Stations.	Number of Vaccinations performed at the Stations respectively.		Number of Charges of Lymph supplied from the Stations respectively.	
		Primary.	Re-vaccinations.	Charged Ivory Points.	Charged Tubes, each estimated as equal to 10 Ivory Points.
Vaccinators salaried from the Parliamentary grant -	1. *Surrey Chapel* - -	799	144	12,768	—
	2. Battle Bridge - -	618	2	—	561
	3. *Tottenham Court Chapel*	1,114	93	195*	1,285
		2,531	239	12,963	1,846
Parochial and other Vaccinators not salaried from the Parliamentary grant, but contributing lymph at a fixed rate of payment.	1. *Manchester* - - -	1,379	5	—	357
	2–5. *Birmingham* - -	6,075	6,043	—	3,200
	6. *Bristol* - - -	645	11	—	392
	7. *Liverpool* - - -	989	2	—	2,040
	8. *Pimlico* - - -	553	7	—	658
	9. *Newcastle-on-Tyne* -	698	124	—	1,034
	10. *Westminster* - -	1,122	13	—	1,680
	11–12. *Marylebone* - -	1,876	52	—	1,054
	13. *Whitechapel* - -	1,303	5	—	658
	14. *Leeds* - - - -	1,081	—	—	544
	15. Coventry - - -	977	1	—	885
	16. *Glasgow* - - -	1,365	11	—	2,154
	17. *Exeter* - - -	600	—	—	236
	18. *Strand* - - -	471	—	—	192
	19. Bromley - - -	928	7	—	1,173
	20. Ancoats - - -	1,349	1	—	4,151
	21. *Sheffield* - - -	1,065	—	—	304
	22. Salford - - -	890	1	—	2,732
	23. Waterloo - - -	569	2	—	2,166
	24. Toxteth Park - -	938	—	—	2,589
	Total - -	24,873	6,285	—	28,199
	General Total -	27,404	6,524	12,963	30,045†

* This number includes 20 charged glasses, each estimated as equal to four charged ivory points.

† During the year additional supplies (to the extent of 725 charged tubes) were obtained from the following gentlemen :—

Mr. R. Biggs - - - -	Bath.
Mr. C. C. Claremont - -	Hampstead Road.
Mr L. M. Griffiths - - -	Clifton.
Mr. F. E. Macaulay- - -	Halifax.

App. No. 4.

National Vaccine Establishment.

III.—Distribution of Lymph, 1874.

Number of applications :—

From medical practitioners in England and Wales -	9,320
„ „ Ireland - - -	4
„ „ Scotland - - -	237
„ the army - - - - - -	533
„ the navy and from the emigration department -	76
„ colonies - - - - - -	206
„ diplomatic and other foreign services - -	102
Total - -	10,478

Supplies sent out :—

Charged ivory points - - - - -	25,492
„ squares of glass - - - - -	20
„ capillary tubes - - - - -	20,869

No. 5.

Report by Dr. Seaton on the Recent Epidemic of Smallpox in the United Kingdom, in its relation to Vaccination and the Vaccination-Laws.

On Smallpox in its relation to Vaccination and the Vaccination Laws.

§ 1.

Course of the late pandemic invasion of smallpox.

The epidemic of smallpox which began in England towards the close of 1870 and terminated in the second quarter of 1873 was part of a general epidemic outbreak of that disease, of world-wide diffusion, marked wherever it occurred by an intensity and malignancy unequalled by any previous epidemic of the disease within living memory. The outbreak seems to have begun in France about a year before it manifested itself in the United Kingdom. In the last quarter of 1869, it was already making considerable progress in Paris; early in 1870, it prevailed in Orleans, Bordeaux, Lyons, and other large towns, and in the course of the year extended with great mortality over nearly the whole of France. Except, however, in so far as it was directly conveyed by French prisoners to various places in Germany, there was very little extension beyond France till towards quite the close of 1870. The epidemic then manifested itself in London, in two or three of the chief towns of Holland, in Milan, at Geneva, and in some other places, becoming thereafter rapidly diffused over a great part of Europe. During 1871, England and Scotland, Holland, Hamburgh, Prussia and the whole North of Germany, Italy, and Spain felt the full force of the epidemic; and the first beginnings of its ravages were experienced in some of the other countries of Europe, as in Ireland and in Denmark. In the course of this year it spread beyond Europe to various places in Africa (where it raged along the Gold Coast), to the West Indies, and to North America. During 1872, while still continuing its course in most of the countries it had attacked in 1871, it made further extensions over the continent of Europe, invading Austria, Hungary, Russia, and Finland, over Africa, and over North America; it spread also to South America and the South Sea Islands; and it invaded various places in the East. In 1873 the greater part of its course in Europe had been run, but there were yet during the earlier part of the year various countries and districts, and important capitals, as St. Petersburgh and Vienna, still under its full influence. By the middle of 1873, however, the pandemic extension of the disease in Europe may be considered to have terminated, and smallpox generally has since then been quiescent, though there have been some considerable local outbreaks.

Its peculiar malignancy.

In every country attacked, so far as our information extends, the peculiar intensity of this epidemic was manifested by the extreme diffusiveness of the disease, by its attacking in unusual proportion persons who were regarded as protected against the disease, whether by previous smallpox or by vaccination, and by the occurrence with quite remarkable frequency of cases of a malignant and hæmorrhagic type, and a consequent unusually high ratio of deaths to attacks. The actual mortality from the disease in the different countries invaded varied however very greatly, the chief determining influence being, as will be hereafter shown, the state of their respective populations in regard to vaccination.

§ 2.

Its outbreak in England.

The recurrence of an epidemic of smallpox in England at the time that this outbreak took place had been anticipated; for the last preceding

epidemic had terminated at the beginning of 1866, and the period of from three to four years—the utmost time which had heretofore intervened between any two epidemic outbreaks of smallpox in this country—had thus already been exceeded. Previous to the Vaccination Act of 1853, epidemics of smallpox had been of still more rapid recurrence. But from 1853, which was the terminal year of a protracted epidemic, there was no outbreak till 1857, when another epidemic set in which lasted until the end of 1859 or beginning of 1860. This was followed by rather more than three years of very low smallpox mortality, the deaths in 1861 being the fewest that have ever been recorded, viz., 1,320, on a population which was then 20,199, 314, or at the rate of 66 per million of population. In 1863 another epidemic set in which lasted till early in 1866, an epidemic which was of much severity, and caused in the aggregate upwards of 20,000 deaths. The four years which succeeded were again years of very small relative mortality; the smallpox deaths, which in 1867 were only 2,513, and in 1868 only 2,052, further declining in 1869 to 1565, or 72 per million of the then population, a death-rate little exceeding that of the exceptional year 1861.* But at the close of 1869 a gradual rise in the smallpox mortality—the invariable precursor of an epidemic outbreak—set in; and before the end of 1870, as the following table shows, the outbreak was upon us:

Smallpox Mortality.

Period.	All England.	London only.
1869, whole year -	1,565	275
1870, first quarter -	405	99
1870, second quarter -	446	118
1870, third quarter -	500	157
1870, fourth quarter -	1,229	584

So clearly in fact had this gradual rise in the mortality of smallpox, which at first was most marked in London, been taken as an indication that another epidemic was impending, that in the spring of 1870, the Lords of Her Majesty's Council (with whom then rested the supervision of public vaccination), felt it incumbent on them to give warning of this to certain metropolitan Boards of Guardians who had been negligent in their administration of the Vaccination Act, 1867, and represent to them the consequences which their neglect would surely entail on their respective unions.

Its high rate of mortality.

The outbreak then was by no means unexpected: but what had not been anticipated, even by the physicians the most experienced in small-

* This sketch applies to the kingdom at large, and not, of course, to each individual part of it at the same time. It often happens that smallpox is epidemic in a particular town, or a particular part of the kingdom, when the kingdom at large is very free from it, and vice versa. Thus, in the epidemic of 1863–5, London was attacked early (in 1863), and contributed largely to the mortality of that year; but in 1864 and 1865, when the disease raged over the country, the smallpox mortality of the metropolis was below the average; whereas in 1866–7, when there was a great subsidence of smallpox in England generally, there was in London a considerable epidemic. In 1869, when smallpox in England was, as shown in the text, almost at its minimum, there was a considerable outbreak in Yorkshire, which division of the kingdom contributed 610 to the 1,565 total deaths of the year. And so, to anticipate a little, in 1874, while the smallpox was very quiescent in the large towns of England generally, it has been very prevalent and fatal in Birmingham.

pox, was the extreme intensity which the outbreak manifested. The varying intensity of different epidemics of the same disease is indeed a well-known fact, and had been illustrated, as regards smallpox, at various times in the Hospital set apart for the treatment of that disease in London : the ordinary mortality of natural smallpox as therein observed, 35 per cent. of the cases admitted, having in certain epidemics been known to mount as high as 47 per cent., and that of post-vaccinal smallpox to increase from 7 to 10 per cent. But no experience which had been acquired in that Hospital had led to the expectation that the ordinary rate of mortality to attacks would by any epidemic influence be nearly doubled. Yet such was the case in 1871 and 1872, in the former of which years the deaths from the natural disease were 66·2 per cent. and in the latter 77 per cent. of the natural cases ; or in the two years combined (for the admissions in 1872 were too few to form by themselves a proper basis of comparison) 67·5 per cent. of such cases : while the deaths in the post-vaccinal cases were 15 per cent. This result is stated by Dr. Munk and Mr. Marson, in their report for 1871, to have been due "to the severity of the disease, and especially to the "number of cases of malignant smallpox, the proportion of which to "other cases has been very largely in excess of anything within the "previous experience of either of your medical officers."*

Comparison of the mortality with that of other recent epidemics of the disease.

In the 33 years which, at the time this outbreak commenced, had elapsed from the first establishment in England of a complete system of registration of the causes of death there had been abundant illustrations of the varying fatality of smallpox epidemics ; but it had been supposed by many—quite erroneously as it now appears—that that period had been sufficient to exhibit the limits of the fluctuations. Only twice since the close of the great epidemic of 1837–41 had the smallpox deaths in England in any year exceeded 7,000, viz. in 1852, when they were 7,320, and in 1864 when they were 7,684. And though the epidemic of 1837–41, just referred to, had exhibited a mortality enormously in excess of these numbers (the deaths in 1838 alone having been no fewer than 16,268), yet as this was anterior to any vaccination laws, and at a time when the proportion of the population which was unprotected by vaccination was many times as great as it is now, a recurrence of any such considerable mortality as was then observed had been quite outside ordinary calculations. The mortality of the 1870–3 epidemic has not indeed been by any means so great in proportion to population as was that of 1837–41, but it has approached it more nearly than had

---

* Report of the Medical Officers of the Smallpox and Vaccination Hospital, London, for the year 1871.—No report was printed for 1872, and I am indebted to the kindness of Mr. Marson for the statistics of that year. No doubt, *severe* cases always find their way in unusual proportion to the Smallpox Hospital, so that its ratio of mortality to cases was higher than in London generally. But even in the Hospitals of the Metropolitan Asylum District, in which the cases admitted would be of a more average character, the ratio of deaths to admissions was extraordinary, amounting to 44·80 per cent. among the unvaccinated, and to 10·15 per cent. among the vaccinated. The ratio in the hospitals of provincial and foreign towns generally has ranged from 40 to 50 per cent. among the unvaccinated, and from 8 to 10 or 11 per cent. among the vaccinated—enormous rates, and attributed everywhere to the same cause, viz : the unusual proportion of malignant, black, and hœmorrhagic cases. In several of these hospitals the rates were as high or higher than in the Smallpox Hospital of London, as in the "Baracken-Lazareth auf dem Templehofer Felde," at Berlin, which were used as additional municipal smallpox hospitals during the epidemic in that city, and in which the mortality among the unvaccinated was 81·25 per cent., and among the vaccinated 14 per cent ; in the Hospital at Leipsic, in which the mortality among the unvaccinated was 71 per cent., and among the vaccinated (including doubtful cases) between 9 and 10 per cent ; and others.

appeared possible. During the 1837–41 epidemic there were registered from July 1st, 1837, to the termination of the epidemic in 1841, 48,012 smallpox deaths in a mean population of 15½ millions;* during the 1870–3 epidemic, 44,433 deaths in a mean population of nearly 23 millions. The proportionate mortality therefore of the epidemic of 1870–3 has been less than two-thirds that of 1837–41.

The progress of the 1870–73 epidemic in England is shown in the following table :—

Deaths from Smallpox: Epidemic of 1870–3.

Period.	All England.	London only.
1870, last quarter -	1,229	584
1871, first quarter -	4,903	2,400
1871, second quarter -	7,012	3,241
1871, third quarter -	4,612	1,255
1871, fourth quarter -	6,380	980
1872, first quarter -	7,720	831
1872, second quarter -	6,521	582
1872, third quarter -	2,953	237
1872, fourth quarter -	1,665	131
1873, first quarter	1,084	46
Total - - -	44,079 †	10,287

By the second quarter of 1873, when the deaths had further fallen to 722, the epidemic may be said to have terminated in England. The smallpox deaths of the last half of that year were but 526; and the smallpox mortality of the entire year was but 2,332, which is much below the annual average.‡

London and Liverpool were among the first places in the Kingdom, and were *the* first places of any importance, to feel the force of the epidemic. Together they contributed 879 to the 1,229 deaths of the last quarter of 1870; and if the smallpox deaths that occurred in them be subtracted from the smallpox mortality of the entire kingdom it will be seen that the apparent decline (as exhibited in the above table) of the epidemic in England in the third quarter of 1871, and its apparent subsequent rise, were simply due to the epidemic having subsided in these two great towns, while it was steadily progressing over the rest of the kingdom.

* The epidemic of 1837–41 was in full force when the system of national registration of births and deaths first came into operation in England, on July 1, 1837; of its earlier ravages therefore we have no account, so that the total number of deaths of the epidemic must have been considerably in excess of the 48,012 stated in the text. In the latter half alone of 1837 the smallpox deaths registered were 5,811; in 1838 they exceeded 16,000; the epidemic then slowly declined throughout 1839 and 1840, causing 9,131 and 10,434 deaths in those years respectively, and did not terminate till 1841.

† These numbers, taken necessarily from the *Quarterly* returns of the Registrar General, are fewer by 354 than the total previously given, in making up which advantage has been taken of the *revised* numbers subsequently published for each year by the Registrar General in his Annual Reports. The Report for 1871 gives 219 smallpox deaths, and that for 1872 gives 135 deaths, beyond those included in the Quarterly returns.

‡ The average annual smallpox deaths in England from 1854 to 1870 inclusive were 3,493.

Deaths from Smallpox: Epidemic of 1870–73.

Period.	England, except London and Liverpool.
1870, last quarter - -	350
1871, first quarter - -	1,441
1871, second quarter - -	3,092
1871, third quarter - -	3,207
1871, fourth quarter - -	5,372
1872, first quarter - -	6,865
1872, second quarter - -	5,923
1872, third quarter - -	2,712
1872, fourth quarter - -	1,528
1873, first quarter - -	1,033

The mortality in the several Registration Divisions;

The earliest centres of infection after London and Liverpool were the mining districts in the North of England and in certain parts of South Wales. By the second quarter of 1871 the epidemic had extended to nearly every one of the eleven registration divisions of the kingdom: the York division, however, which was the last attacked, not feeling its influence to any considerable extent till the third quarter of that year. The degree in which each division suffered is shown in the following table.

Division.	Enumerated Population, 1871.	Smallpox Deaths.		Smallpox Deaths per 1,000 of population.		
		1871.	1872.	1871.	1872.	Mean of the two years
I. London - -	3,254,260	7,912	1,786	2·43	0·54	1·48
II. South Eastern -	2,167,726	993	1,050	0·45	0·48	0·46
III. South Midland -	1,442,654	617	878	0·42	0·61	0·51
IV. Eastern - -	1,218,728	759	1,067	0·62	0·87	0·74
V. South Western -	1,880,777	896	1,142	0·47	0·61	0·54
VI. West Midland -	2,720,669	1,044	3,838	0·38	1·41	0·89
VII. North Midland -	1,406,935	554	1,853	0·39	1·31	0·85
VIII. North Western -	3,389,044	3,597	864	1·06	0·25	0·61
IX. York - -	2,395,569	1,023	2,443	0·47	1·01	0·74
X. Northern - -	1,414,234	4,646	2,040	3·28	1·44	2·36
XI. Welsh - -	1,421,670	1,085	2,133	0·76	1·50	1·13
England - -	22,712,266	23,126	19,094	1·024	0·833	0·928

Thus the South Eastern and South Midland divisions, notwithstanding their dangerous proximity to London, suffered least; the Northern division incomparably the most; next to which came the Metropolis; and then the Welsh division.

The Northern division of the kingdom comprises the counties of Durham, Northumberland, Cumberland, and Westmoreland. But it is to the mining county of Durham and to three unions in Northumberland alone that the division owes its bad pre-eminence. The smallpox death rate of the whole county of Durham in 1871 was 4·52 per thousand; that of the towns of Sunderland and South Shields being nearly the double of this. In 1872 the smallpox death rate of Durham county was 1·87; and the mean of the county for the two years was 3·19, or more than threefold that of the kingdom at large. The great number of deaths in the Newcastle-on-Tyne, Tynemouth, and Morpeth unions in 1871 caused the smallpox death rate in Northumberland in that year to be

2·95 per 1,000, the following year it was 0·92, the mean of the two years being 1·93, or more than double the rate of the kingdom at large.

So in the Welsh division, the excess of mortality over the average of the kingdom (much less marked than in the Northern division) was due to the mining districts of Monmouthshire and South Wales: the mortality of North Wales was much below the average. The smallpox death rate of Monmouthshire was, in 1871, 1·44, and in 1872, 2·53 per thousand, the mean for the two years being 1·98: in the Bedwellty union it was 3·2 per 1,000 in 1871, and 5·2 per 1,000 in 1872. In South Wales the death rate was 0·76 per 1,000 in 1871, and 1·88 in 1872, the mean being 1·32. The unions chiefly contributary to this high death rate were Pontypridd, Merthyr, Neath, and Swansea. In Pontypridd the smallpox death rate was the highest, amounting in 1872 to 6 per 1,000 of population; the epidemic, however, in this union ran its entire course in this one year, there having been only 7 smallpox deaths in 1871.

The West Midland division, comprising the counties of Gloucestershire, Herefordshire, Shropshire, Staffordshire, Worcestershire, and Warwickshire, would have stood very differently to what it does in the Table but for the mining county of Staffordshire, which, with about a third of the population of the whole division, contributed in 1871 considerably above half, and in 1872 nearly two thirds, of its smallpox deaths.

These facts bring out with great force the urgent need which exists for a more effective sanitary supervision of the mining class of our population.

and in the chief towns.

The following table exhibits the mortality of the epidemic in the 18 chief towns of England:—

Town.	1871.			1872.		
	Estimated Population in the middle of the year.	Total Smallpox Deaths in the year.	Smallpox Deaths per 1,000 of population.	Estimated Population in the middle of the year.	Total Smallpox Deaths in the year.	Smallpox Deaths per 1,000 of population.
London - -	3,263,872	7,912	2·43	3,311,298	1,786	0·54
Portsmouth - -	113,450	39	0·34	115,455	508	4·39
Norwich - -	80,533	245	3·04	81,105	317	3·9
Bristol - -	183,298	45	0·24	186,428	209	1·12
Wolverhampton -	68,476	284	4·14	69,268	180	2·6
Birmingham -	344,980	61	0·17	350,164	298	0·82
Leicester - -	95,882	11	0·11	99,143	313	3·15
Nottingham - -	86,929	144	1·65	88,225	205	2·32
Liverpool - -	494,649	1,919	3·9	499,897	50	0·1
Manchester - -	351,488	267	0·75	352,759	75	0·21
Salford - -	125,422	227	1·8	127,923	41	0·32
Oldham - -	(This town first took its place among the "chief towns" in 1872.)			84,004	26	0·3
Bradford - -	146,987	5	—	151,720	32	0·21
Leeds - -	260,657	43	0·16	266,564	268	1·0
Sheffield - -	241,507	406	1·68	247,847	601	2·42
Hull - -	122,266	57	0·46	124,976	216	1·72
Sunderland - -	98,797	850	8·6	100,665	54	0·54
Newcastle-on-Tyne	128,677	695	5·4	130,764	135	1·03

Sunderland, which in 1871 had more than double the smallpox death rate of any town except Newcastle-on-Tyne, still, by a long way, heads the list on a review of the two years combined; then come Norwich, Wolverhampton, Newcastle-on-Tyne; followed, at some considerable interval, by Portsmouth, Sheffield, Liverpool, Nottingham, and Leicester. The lowest average annual smallpox death rate of these ten towns for the two years was in Leicester, where it amounted to 1·6 per thousand. The death rate of the remaining chief towns was considerably smaller.

Comparison of mortality of this epidemic with the mortality of last century.

The mortality of this epidemic was, as I have said, such as had not been known in England for 30 years, and has at least proved a complete answer, if indeed an answer had been required, to the notion which had of late years been ventilated by some that smallpox was a disease tending naturally to extinction. What was the mysterious "epidemic influence" which caused such peculiar intensity of the disease at this particular time is quite unknown to us. But before proceeding further, it seems very important that it should be noted that the mortality of this epidemic, alarming to us as it has been, has not approached what was the *usual annual* smallpox mortality of the kingdom at the time when vaccination was unknown. The *annual average* smallpox death rate of that period,—not, be it observed, the death rate of a particular year of special prevalence of the disease, but the *annual average* death rate—was more than threefold the death rate of this, in our time quite exceptional, outbreak. The estimated annual smallpox death rate of England in the last century was 3,000 per million of population: the mean annual death rate of this epidemic was 928 per million, having, in 1871, been 1,024, and in 1872, 833 per million. The average annual smallpox death rate of the metropolis in the pre-vaccine period was from 400 to 500 per hundred thousand of population;* the mean annual death rate of this epidemic was 148, having, in 1871, been 243, and in 1872, 54. And if an average be taken of the smallpox mortality of England for the whole 20 years (1854–1873) during which there has been a compulsory vaccination law, *a period which includes the whole of the recent epidemic*, the annual death rate is found to be 245 per million of population, or less than a twelfth of the rate of last century.

The smallpox deaths in England were 2,332 in 1873, and 2,112 in 1874. In the former of these years some manifestations of the epidemic continued in Birmingham, Leeds, and Portsmouth. In the latter year, Birmingham was the only important town which suffered at all seriously from smallpox. London, since the termination of the epidemic, has enjoyed an immunity from smallpox which is unprecedented. The total deaths from that cause in 1873 were 115, and in the present year (1874) have been 56 only.

Outbreak of the epidemic in Ireland.

The epidemic invaded Ireland towards the end of the third quarter of 1871, and it lasted till the second quarter of 1873. The total smallpox deaths for the years 1871 and 1872 (including 105 deaths which had occurred in the first two quarters of 1871, before the disease had spread as an epidemic), were 3,913, viz., 665 in 1871, and 3,248 in 1872. If to these be added 379 deaths which occurred in the first two quarters of 1873,† we have a total mortality of 4,292 in two years and a half, giving an annual death rate for that period, on the enumerated population of 1871 (5,412,377), of 0·31 per thousand of population. In 1872, the year of severest mortality, the death rate was 0·60 per thousand of population. Belfast and Dublin were in 1871 the Unions which suffered most, contri-

---

	Smallpox Deaths per 100,000 of population.
* Average of years 1660–79	417
„ 1728–57	426
„ 1771–80	502

See table by Dr. Farr, p. 10 of "Papers relating to the History and Practice of Vaccination." The increased smallpox mortality towards the close of the last century was attributed to the then prevalent practice of inoculation.

† By the third quarter of 1873 the epidemic had quite subsided, only 30 deaths from smallpox being registered during that quarter. During the present year (1874) there has been a recrudescence of the disease in Ulster, and some extension in Connaught, in which the illegal practice of smallpox inoculation appears to have played a part. The year's mortality, however, from smallpox is below the average of the preceding ten years.

buting, as appears from the detailed Annual Report of the Registrar General for Ireland, 509 to the 665 smallpox deaths of that year. In 1872 the disease was diffused more or less over the whole of Ireland, with the exception of the province of Connaught. The chief mortality was in the cities of Dublin and Cork. The deaths in Dublin in 1872 were 1,350, and throughout the whole of the epidemic 1,557, or at the rate of 5 per thousand of population, a rate exceeding that of any large English town except Sunderland, Norwich, Wolverhampton, and Newcastle-on-Tyne. The deaths in Cork were 1,873, or at the rate of 9·6 per thousand of population, which is a higher rate than that of any large town in England.

Its outbreak in Scotland.

The epidemic reached Scotland also in 1871. The detailed returns of the causes of death in that year have not yet been published, but I am indebted to Dr. Robertson, of the General Register Office, Edinburgh, for the information that the smallpox deaths of the year amounted to 1,432, or 0·42 per thousand of the population. The year following, the deaths were much more numerous, but the actual numbers cannot yet be given. Full information, however, for the whole two years, as also for 1873 and 1874, exists concerning the eight chief towns of Scotland. Of these, Glasgow and, to a much slighter extent, Greenock exhibited manifestations of the epidemic influence early in 1871; but such manifestations were of comparatively small amount and short duration, and it was not till the last quarter of 1871 that the force of the epidemic began largely to be felt in any of the towns in question. It continued until the end of June 1872, by which time, in most of them, it had terminated. The smallpox deaths in the eight towns were 886* in 1871, of which 646 occurred between the months of September and December inclusive, and 1,537 in 1872, of which 1,359 were from January to May inclusive; there being only 178 in the remaining seven months of the year. Edinburgh, Leith, Glasgow, Dundee, and Aberdeen were the towns which contributed chiefly to this mortality, as will be seen by the following table:

Town.	1871.				1872.			
	Estimated Population in the middle of the year.	Total Small-pox Deaths in the year.	Small-pox Deaths under five years of age.	Total Small-pox Deaths per 1,000 of population.	Estimated Population in the middle of the year.	Total Small-pox Deaths in the year.	Small-pox Deaths under five years of age.	Total Small-pox Deaths per 1,000 of population.
Glasgow - -	479,922	180	62	0·37	489,421	148	25	0·30
Edinburgh -	201,766	169	27	0·78	205,009	702	150	3·4
Dundee - -	121,535	375	82	3·00	124,817	299	107	2·4
Aberdeen - -	88,567	33	4	0·37	90,057	132	21	1·4
Greenock - -	60,245	30	9	0·49	62,097	9	3	0·15
Leith - -	46,753	82	14	1·76	47,888	222	53	4·6
Paisley - -	48,272	3	3	0·06	48,355	9	2	0·19
Perth - -	26,378	8	1	0·30	26,417	16	1	0·61
The eight towns -	1,073,608	880	202	0·82	1,094,061	1,537	362	1·41

But though during the latter half of 1872 these towns were mostly free from unusual smallpox mortality, the disease lingered in Glasgow, and during the course of 1873 and early months of 1874 both Glasgow and Greenock, suffered severely enough to show, like Birmingham in England, that the epidemic had not during the two years in which it so extensively prevailed over the kingdom at large completely exhausted

* These are the *revised* numbers as supplied by Dr. Robertson, and differ by six from the numbers given in the Table.

itself nor lost its virulence of character.* In Glasgow, in which the smallpox deaths of the last half of 1872 had been only 51, as against 97 of the preceding half-year, these rose in 1873 to 226, a death rate of 0·42 per thousand of population. In the first four months of 1874 they were 173; in May they fell to 18, and in June to 8, by which time the epidemic in that city may be regarded as over. There had thus been in Glasgow a continuance, with intervals of quiescence, for three years and a half. The total smallpox deaths during that period were 727, giving an annual average death rate of 0·42, for the time the epidemic lasted. Greenock, as the table shows, suffered but little in 1871–2, but it had a sharp outbreak in 1873, the deaths in that year being 198 or 3·2 per thousand of population; a rate equal to that of Dundee in 1871 and of Edinburgh in 1872. There were 21 deaths in January 1874, from which time the disease rapidly declined. In Paisley, there was a small outbreak of about three months' duration, in the spring of the present year (1874.)

§ 3.

The materials at my command do not enable me to present nearly so complete an account of the mortality of this epidemic on the Continent of Europe as I should have desired, partly because in most of the States statistics of the causes of death are either not kept, or kept very imperfectly, and partly because in many of those States in which systematic records of these causes are kept, the abstracts are not yet completed for the whole period under consideration.† We have, however, quite sufficient information from several of the Continental States to enable us to make an accurate general comparison of the mortality from the epidemic which occurred in them with that which occurred in the United Kingdom.

In Prussia.

Prussia was, after France, the first Continental State to feel the force of the epidemic. The disease seems to have been imported there by the French prisoners, who, in the latter months of the year 1870, arrived in large numbers, and were distributed over various parts of the kingdom. This circumstance, together with the general movement among the Prussian population itself which resulted from the war, caused the disease to spread with a rapidity unknown in previous epidemics, and a large portion of the kingdom to be brought speedily under its influence, so that the smallpox deaths of Prussia, which in 1870 were 4,200, rose in 1871 to 69,839, equivalent to a death rate of 2·43 per thousand of the population, or very nearly twice and a half the smallpox death rate of England for the same year. The epidemic continued over Prussia in 1872; of the total mortality it caused during

---

* In some at least (of course I have not information as regards all) of the local outbreaks which have occurred in 1873 and 1874, the smallpox has shown the same *malignant character* as it did in 1871–2, a circumstance which is calculated to cause anxiety with regard to future general epidemic extensions, and which should make us doubly careful in maintaining all our defences against this fatal disease.

† The great delay which takes place in this respect is remarked on in several of our Consular despatches. Accurate detailed analyses of large numbers of entries demand, of course, a great deal of time. It is, I am well aware, by accident only that the Abstracts of mortality in England during 1872 did not appear in the summer of the present year (1874), and cannot yet be published; but seldom is much less than a year and a half required even by our own indefatigable Registrar General to get out an Annual Abstract; and the Abstracts for Ireland and Scotland are always much later in appearing than those for England. In fact the Registrar General for Scotland has not yet published the detailed Abstracts of 1871. [As these sheets are passing through the press the Abstracts for England in 1872 and Ireland in 1872 have made their appearance.]

that year, an account has not as yet been received. For Berlin, however, the statistics are complete for the whole period of the epidemic, which lasted in that city from the latter part of 1870 until July 1872. The deaths from it in 1871 amounted to 5,084, or 6·15 per thousand of population. In 1872 they were 1,100, or 1·33 per thousand of population.* The entire deaths reported for the whole period the epidemic lasted were 6,478, of which 2,837 were in children under five years old.

In Holland.

From Holland, the official information for the whole course of the epidemic, excepting certain details for 1872, is complete.† The force of the epidemic began to be felt in that country in November 1870; of 706 smallpox deaths which occurred in the Netherlands during the whole of that year, no fewer than 553 were in the months of November and December, viz., 126 in November and 427 in December; of the 706 deaths, 293 were in children under the age of five years. The disease then spread rapidly, and in 1871 the total deaths from it in the kingdom amounted to 15,787 (or 4·3 per thousand of population), of which 7,734 were in children under the age of five years. In 1872, the epidemic declined and terminated, the deaths amounting to 3,731 (or above 1 per thousand of population), of which 1,622 were in children under five years of age. The smallpox death rate of Holland in this year of the decline of the epidemic was thus as high as was that of England during the year when the disease amongst us was at its height. The provinces of North Holland, South Holland, and Utrecht, were those which chiefly suffered. The mortality in these provinces in 1871 and 1872 was as follows :—

Province.	Population at end of 1870.	Total smallpox deaths in 1871.	Smallpox deaths in children under the age of five years in 1871.	Total smallpox deaths in 1872.	Total Smallpox Deaths in 1871 per 1,000 of population.	Total Smallpox deaths in 1872 per 1,000 of population.
North Holland -	587,528	3,909	1,587	713	5·2	1·2
South Holland -	711,457	7,504	4,138	1,275	10·5	1·8
Utrecht - -	174,775	1,972	820	309	11·3	1·2

The mortality in the chief towns in 1871 and 1872 was as follows :—

Town.	Population, at end of 1870.	Total Smallpox Deaths in 1871.	Smallpox Deaths under five years of age in 1871.	Total Smallpox Deaths in 1872.‡	Total Smallpox Deaths in 1871 per 1,000 of population.	Total Smallpox Deaths in 1872 per 1,000 of population.
Amsterdam - -	273,510	2,165	1,281	223	7·9	0·81
Rotterdam - -	123,677	1,701	1,120	6	13·7	0·05
The Hague - -	92,454	1,306	840	10	14·0	0·1
Utrecht - -	60,752	772	418	20	12·7	0·32
Leyden - -	40,009	403	277	5	10·0	0·12
Groningen - -	38,006	227	64	36	5·9	0·94
Arnheim - -	32,984	27	11	34	0·82	1 03
Haarlem - -	31,688	12	6	48	0·38	1·51
The eight towns -	693,080	6,613	4,017	382	9·54	0·55

* Despatch, Aug. 22, 1873, from H.M. Chargé d'Affaires at Berlin, enclosing official account of the smallpox epidemic.

† Despatch, July 4, 1873, from H.M. Minister at the Hague, supplemented by detailed (official) information subsequently forwarded by Dr. Ballot.

‡ The smallpox deaths *under five years of age* in 1872, though supplied for the kingdom at large in the official information sent, were not supplied for the separate

The official information concerning smallpox in Sweden in 1870, 1871, and 1872 tends to show that that kingdom was during those years little affected by the epidemic then raging over the greater part of Europe. There had been, indeed, an epidemic in Sweden during the quinquenniad 1865–1869, and this in 1870 was apparently on the decline. The smallpox deaths for the whole kingdom during 1870 were but 410, and further declined the year following to 230. In 1872 they were of about the same amount, viz., 256. Stockholm contributed to this mortality 104, 111, and 44 deaths in each of these years respectively. But in December 1873 there set in at Stockholm an epidemic, the proportions of which were more in correspondence with those of the recent pandemic outbreak: the deaths in that city having amounted to 618 from December 1873 to April 10 in the present year (1874), at which time the epidemic was described as still raging.* The population of Stockholm is but 143,735, so that evidently its smallpox death rate for this year will be considerably in excess of that of London, or even of that of Liverpool, in 1871.

In Sweden.

In Denmark.

In Denmark also the mortality from smallpox was not considerable either in 1871 or in 1872. There was however a distinct outbreak, commencing in the former and terminating in the latter of those years. The smallpox deaths of the entire kingdom were 108 in 1871 and 381 in 1872; those of Copenhagen 23 and 218 in the two years respectively. These numbers represent a smallpox death rate per thousand of population of 0·06 for 1871, and 0·2 for 1872 in the whole kingdom, and of 0·13 in 1877 and 1·2 in 1872 in Copenhagen.† Of the 241 deaths in Copenhagen, 85 were in persons under the age of 15.

In Hamburgh.

In the State of Hamburgh the epidemic set in, as in England and Holland, towards the close of 1870. There were registered in that year 83 deaths from smallpox, of which 56 took place in the months of

---

provinces and towns. If the proportion of these to the total smallpox deaths of the year were the same as in the previous years, they would have amounted in the eight towns to 229. In three of the above towns, viz., Rotterdam, the Hague, and Utrecht, the epidemic began in 1870, so that to complete the account for them there would need to be added to the numbers given in the Table 56 deaths in Rotterdam, 270 in the Hague, and 143 in Utrecht, of which 32, 125, and 62 respectively were under five years of age.

* Despatch, April 14th, 1874, from H.M. Minister at Stockholm. There is a discrepancy, which I am unable to account for, between the number of deaths in 1870 and 1871, stated in Mr. Erskine's despatch, which was supplied him by the Swedish Minister for Foreign Affairs, General Björnstjerna, and is authenticated by Bruzelius the Secretary to the College of Health, and the deaths for the same year, as given by Dr. Guttstadt in his official report on the "Pocken-Epidemie in Preussen," which appear to have been supplied him by Dr. Berg, the head of the Statistical Central-bureau in Stockholm. The following is the information supplied by Dr. Berg, whose figures I give for as far back as from 1855, when the Table given at p. 186 of the "Papers relating to the History and Practice of Vaccination" terminates:—

Year (up to 1870 average of five years).	Population.	Annual Smallpox Deaths (up to 1870, average of five years).	Annual Smallpox Deaths per 1,000 of Population.
1850–54	3,541,717	1,196	0·33 (a)
1855–59	3,704,379	682	0·18
1860–64	3,967,118	419	0·10
1865–69	4,160,467	1,303	0·31
1870	4,168,525	764	0·18
1871	4,204,177	339	0·08

(a) This is the last complete quinquenniad given in Mr. Simon's Tables.

† Despatches from British Consul, October 14th, 1873, and April 26th, 1874.

November and December. The disease then steadily progressed month by month till August 1871, when the epidemic culminated. The deaths in June, July, and August were no fewer than 1,635, of which 578 were in August. The period of decline then commenced, but the outbreak did not terminate till the spring of 1872. In December 1871 there were 170 deaths; in January 1872, 132; in February, 98; in March, 43; in April, 15; in May, 18; after this only occasional entries are met with. The total smallpox deaths in 1871 were 3,647, or 28·97 per cent. of the year's mortality from all causes; and 10·76 per thousand of the living population (338,974). In 1872 the smallpox deaths were 318.* Of the 3,965 deaths in 1871–2, 1,938 were in children under five years old.

In Saxony.

Our official accounts for Saxony relate to the city of Leipzic only. In that city the epidemic began and terminated in the course of 1871, the smallpox deaths of 1870 having been only 5, and those of 1872 only 21. But in 1871 they amounted to 1,042, which, in a population of 106,925, gives a death rate of nearly 10 per thousand :† 659 of the deaths were in children under 5 years of age.

In France and Belgium.

No general official records of death-causes exist either for France or Belgium. The only information attainable regards particular places. A despatch received from Brussels, shows that the smallpox epidemic began there towards the close of 1870 and extended into 1871, causing in the former year 224 and in the latter 923 deaths, a death rate on the population of that city of 0·7 and 2·9 per thousand respectively.‡ In Paris the course and mortality of the epidemic were largely influenced by the movements of population consequent on the war, and especially on the siege of that City. Before, however, any of these movements had begun to take place, and even in fact before the war was declared, there had already been from the beginning of November 1869 to the end of June 1870, no fewer than 3,346 smallpox deaths, the disease being at that time rapidly on the increase.§ The recorded deaths from it in 1870 were 10,539; in the first three months of 1871 they were 2,496; the epidemic was then rapidly declining. Of 7,816 deaths which occurred between October 1870 and March 1871 inclusive, 1,600 were among the military.

In Austria.

In Austria (exclusive of Hungary, for which there is no complete return), the total smallpox deaths in 1871 were 7,389, and in 1872, 37,878.‖ These deaths were thus distributed over the respective provinces :—

---

* Despatches from British Consul-General Annesley, August 25th, 1873, and March 23, 1874.

† Despatch from British Consul-General, August 29th, 1873. [As these sheets were passing through the press, a Despatch was received from H.M. Chargé d'Affaires at Dresden, giving particulars of the smallpox mortality in the kingdom of Saxony in 1870 and 1871. The total smallpox deaths of those years were 7,869; concerning 11 of which it is not stated in which of the two years they occurred, but of the remaining 7,858, the distribution was 743 in 1870, and 7,115 in 1871. Taking the population of Saxony at 2,556,244, the smallpox death rate for 1871 was 2·8 per thousand, being rather higher than that of Prussia, and considerably more than twice and a half as high as that of England for the same year. The return does not extend to 1872. Of the total 7,869 deaths, there is no statement with regard to the age in 796; but 5,270 of the remaining 7,073 deaths were in children under the age of 10 years.—E. C. S., March 9, 1875.]

‡ Despatch from Mr. Lumley, September 6, 1873.

§ Bulletin de Statistique Municipal.

‖ Despatch from His Excellency Sir A. Buchanan, April 18, 1874.

Province.	Population, 1870.	Deaths from Smallpox in 1871.	Deaths from Smallpox in 1872.
Lower Austria - -	1,990,708	1,169	7,540
Upper Austria - -	736,557	264	1,045
Salzburg - -	153,159	149	309
Styria - - -	1,137,990	190	771
Karinthia - -	337,694	81	121
Carinola - - -	446,334	58	187
Triest - - -	600,525	33	915
Görst and Gradiska -		18	116
Istria - - -		17	364
Tirol - - -	885,789	95	101
Vorarlberg - -		28	72
Bohemia - - -	5,140,544	1,129	8,098
Moravia - - -	2,017,274	583	3,762
Silesia - - -	513,404	165	3,133
Galicia - - -	5,444,683	2,703	10,820
Buckowina - -	513,404	545	524
Dalmatia - -	456,961	162	?
Totals - -	20,375,026	7,389	37,878

The smallpox death rate for Austria in 1871 on the estimated population of that year was 0·36, and for 1872 on the estimated population of that year, 1·8 per 1,000; but the epidemic, it must be remembered, did not nearly complete its course in those two years, and was very fatal in 1873, for which year no returns have yet been forwarded. The deaths in Vienna in 1871–2 amounted to 3,807. The official returns do not distinguish the ages at death, and state that there are no materials for giving them.

In Russia, &c.

The official returns for Russia extend only to the city of St. Petersburgh, in which, between April 13th, 1872, when smallpox was first officially notified, and June 24th, 1873, 1,850 deaths were reported.

In Italy the epidemic extensively prevailed in 1871 and 1872; and in Spain and Portugal its ravages were very great. But we have no statistical accounts for either of these kingdoms.*

On a general review of the above statements it will be seen that none of the various countries, concerning which we have precise information, has exhibited so low a rate of mortality from smallpox, during the recent epidemic, as the United Kingdom, with the single exception of Denmark, and with reservation as regards Sweden, where the epidemic has still to complete its course. The death rate of Prussia in 1871 was considerably more than twice as great as that of England; it may be that when the returns of 1872, which we have yet to receive, are added, the disproportion will be somewhat less.† The death rate of Holland for the entire epidemic has been three times as great as that of England: and the difference is still greater on comparison with Ireland.

* It does not come within the purpose of this Report to review the mortality caused by this epidemic in countries, as in parts of the East and of Africa, which are almost wholly unprotected by vaccination; but as affording an example of the ravages of smallpox under such circumstances at the present day, I may refer to the town of Brunei in Borneo, where in a very few months, at the end of 1872 and beginning of 1873, upwards of 4,000 persons were swept off by it in a population of about 35,000 (Despatch from Consul-General Bulwer, February 27, 1873). On the Gold Coast in 1871, smallpox is described by Acting Administrator Salmon as decimating the population. "Nothing," says he, "but the active interference of the local government could have saved the people from annihilation." (Despatch, January 3, 1872.)

† Prussia has swallowed up many States, and among them the former Kingdom of Hanover, always notable for its carefulness as to the vaccination of its population;

On Smallpox in its relation to Vaccination and the Vaccination Laws.

§ 4.

History of the compulsory vaccination laws in the United Kingdom.

About 20 years ago (in 1853) the Epidemiological Society of London communicated to the Home Secretary a report of an extensive inquiry which had been made by them into the "State of smallpox and vaccination in England and Wales and other countries," in which they showed that the then average proportionate smallpox mortality in England and Wales was considerably more than double the smallpox mortality of any of those European States in which vaccination was directly or indirectly compulsory, and that the mortality in Scotland and Ireland was much greater even than that in England. This report, which was subsequently presented to, and printed by order of, Parliament, supplied the arguments on which the first compulsory vaccination law for England, a law which has been since much amended, was enacted in 1853. Ten years later (in 1863) compulsory laws were passed for Scotland and Ireland. And an examination of the provisions and working of these laws will enable us, I think, to explain without difficulty why it is that the United Kingdom now holds among European States a position so entirely different in regard to smallpox mortality to that which it held at the time the Society's report was presented.

Special feature of these laws as compared with compulsory laws on the continent.

The vaccination laws of the United Kingdom require the performance of vaccination at an earlier age than those of any foreign State. It was in fact the main argument of the Epidemiological Society's report, that to establish an effective control over the smallpox mortality of any kingdom, it is indispensable to secure the vaccination of children *in early infancy*. Children are liable to contract smallpox at the very earliest age, and indeed so liable to contract it young, that at the time the report was made no less than from 70 to 80 per cent. of the entire smallpox mortality of Great Britain and Ireland occurred under the age of 5 years, and 25 per cent. even under the age of one year.* Vaccination is as safe an operation in early infancy as at any other period of life. Hence it was obvious that any law which, though directly obligatory, permitted, say, a whole year from birth to pass before requiring vaccination, like the law of Prussia, or two years, like the law of Sweden, must be fundamentally defective and leave an unnecessarily large amount of the young population exposed to the ravages of smallpox; *à fortiori*, that laws which were only indirectly obligatory, as by requiring, for example, a certificate of vaccination before a child could be admitted to school, permitted a still greater waste of life.

The law for England requires that children should (health permitting) be vaccinated within three months from birth, or in rural districts (where public vaccination is only carried on periodically) at the first public vaccination held in the district after the child shall have attained

---

and it is worthy of remark that of all the provinces of the present Prussian Kingdom the province of Hanover (which comprises, I believe, only part of the former Kingdom of that name) is the one which, in the epidemic of 1871, had the least smallpox mortality. The death rate of the Kingdom being 2·43 per 1,000, that of Hanover was 0·53.

* In countries in which, as in parts of the East, vaccination has only as yet reached a relatively small proportion of the population, the smallpox deaths are *nearly all* in young children. Dr. De Renzy, the sanitary commissioner in the Punjaub, says, with reference to the great smallpox epidemic which has prevailed there since 1872, that the deaths are confined almost entirely to young children under 10 years old; *the adults having previously all had smallpox*, with which most of them were scarred, many partially or totally blinded.—(*Lancet*, March 1, 1873, and *Medical Times and Gazette*, July 19, 1873.) In England, before vaccination was known, Dr. Haygarth tells us that in 1781, on examination of the Cheshire and Lancashire Militia, it was found that only one in twenty had not already had the smallpox. (Haygarth, Sketch of a Plan to exterminate the casual smallpox. 8vo. Lond., 1793.)

the age of three months. In Scotland and Ireland, in which divisions of the United Kingdom the population is much less aggregated in large towns than it is in England, the age is fixed at six months. The persons affected by the operation of these laws therefore are persons above these ages respectively, who, if born in England were born subsequent to August 17th, 1853, and if born in Scotland or Ireland subsequent to December 31st, 1863—these being the days from which the compulsory laws in the respective divisions of the kingdom first took effect. When the epidemic wave of smallpox reached England towards the close of 1870, it should then, had the vaccination law of 1853 acted according to its full intention, have found the population up to the age of 17 years, except the very youngest, protected against the disease; and it is in the smallpox mortality of persons *under* that age that whatever influence that Act may have had, is to be looked for. In like manner, when the disease extended early in 1871 to Scotland and Ireland, it would be on the population then under seven years of age, and as the epidemic advanced, on those under eight or nine years of age, that the influence of their compulsory vaccination laws would have to be sought.

There are considerable points of difference in the machinery and provisions of the Acts in force in England, Scotland, and Ireland respectively; and in proceeding to consider, as I purpose now to do, the effect which these Acts have had in diminishing the smallpox mortality in each division of the kingdom, it will be convenient to begin with Scotland on account of the greater precision of our information as to the state of vaccination of young children in this than in either of the other divisions of the kingdom.

Provisions and working of the law in Scotland.

(*a.*) Scotland.—Under the Vaccination Act in force in Scotland, if the successful vaccination, lawful postponement of vaccination, or death of any child on the birth registers, be not registered within six months from its birth, the parent receives a notice requiring the production within a certain time of the necessary vaccination certificate, and, if he do not produce it within that time, becomes liable to the penalties of the law. The annual returns which have been supplied by the Registrar General for Scotland of the working of this law, as respects the children born in Scotland from January 1, 1864 (the date of its commencement) to December 31, 1871 inclusive, show that, after deduction had been duly made of such children as had died before they could be vaccinated, there were, out of every hundred children remaining, ninety-six and a half certified as successfully vaccinated or otherwise protected against smallpox by the time the return for each year was made up, one in whom vaccination was lawfully postponed on account of the child's health, or had been tried so many times unsuccessfully as to justify under the law a certificate of insusceptibility, and two and a half unaccounted for on the registers. These latter cases were, almost without exception, cases which had removed and could not be traced.* Of the $3\frac{1}{2}$ per cent. thus not finally accounted for as protected when the year's return was

* The exact figures, on the average of the annual returns of the eight years 1864-71 inclusive, are these, the deaths without vaccination each year having been previously deducted: 96·385 per cent. registered as having been successfully vaccinated, and another 0·052 per cent. as having had smallpox, making 96·437 per cent. protected at the date of the return. The unprotected, and those concerning whose protection there is no information, consist of (1) 0·742 per cent. cases postponed by medical certificate, (2) 0·316 per cent. said to be "constitutionally insusceptible" (which means, of course, nothing more than that vaccination has been three times unsuccessfully attempted), and (3) 2·505 per cent. "removed from district before vaccination, or otherwise not accounted for." A subsequent return, for the year 1872, gives as the result for that year 96·861 per cent. as vaccinated, 0·059 as having

App. No. 5.

On Smallpox in its relation to Vaccination and the Vaccination Laws.

made, many of course would have been subsequently successfully vaccinated.

From this statement it is obvious that that portion of the population of Scotland which at the time the recent epidemic broke out was under the age of seven years, and which is now under the age of ten years, is remarkably well protected against smallpox, but it is almost equally obvious that it is not, and in the nature of things cannot be "universally" vaccinated, nor constitute a class among whom, if smallpox prevail in the country, there could be any reasonable expectation of meeting with *complete* exemption from that disease. For it includes (1) all who are under the age by which vaccination is enforceable, of whom, of course, a very large proportion would be unvaccinated; (2) not a few somewhat above that age, still remaining unvaccinated from the carelessness of their parents in neglecting to have the vaccination done till they had received the legal notice of warning, and risking it probably for some time after that; (3) children in whom there was postponement of vaccination on account of their state of health; and (4) many doubtless still unprotected among the cases which had appeared in each year's return as "postponed," "insusceptible," or "unaccounted for." Now, as there are nearly 120,000 children born in Scotland every year who, until they are six months old, do not come under the operation of the law; as there are about 1,000 of each year's births carried on as postponed, or insusceptible; and as there are about 2,500 annually respecting whom nothing is known, it is quite certain that there must always at any given time be, among the young population of Scotland—extremely well protected as it is on the whole—a considerable actual number of unvaccinated children.

Its effect on the smallpox mortality of children under the age of five years;

According to the classification of ages adopted by the Registrar General for Scotland in his Monthly Returns of Deaths, viz., those under five years of age, those at 5 to 20 years, those at 20 to 60, and those above 60 years, it is evidently in the first of these classes (those under five years old) that the effects of the Vaccination Act on the smallpox mortality is chiefly to be looked for, the children who in 1871 were between five and seven years of age, or in 1872 between five and eight years of age, constituting but a small portion of that class of the population which are between the ages of 5 and 20 years. Now up to the date of the compulsory law the average annual deaths from smallpox in Scotland among children under five years of age constituted 74 per cent. of the whole mortality from that disease, there being scarcely any variation from the average from year to year. But gradually, from the year 1864 onwards, as the law began to tell upon the young population, this high percentage was reduced, first to two-thirds, then to less than half, till at the end of seven years, in 1871, when the recent epidemic broke out in Scotland, the proportion which the deaths under five years of age bore to the total deaths from smallpox had become considerably less than one quarter, was, in fact, not very much more than one-fifth. The facts for 1871 are shown for the whole of Scotland, and for the groups of districts into which the Registrar General divides that kingdom, in the following table, for which, in anticipation of the detailed Annual Report for that year, I am indebted to the kindness of Dr. Robertson.

as compared with previous mortality in Scotland under that age;

---

had smallpox, 0·747 as postponed, 0·169 as "insusceptible," and only 2·164 as "removed," &c. A comparison in fact of the last three years (1870–2) with the first three years (1864–6) of the working of this Act shows that this working is becoming more and more complete; the cases "removed or otherwise not accounted for" during the later period averaging only 2·332 per cent. per annum, as compared with 2,596 in the earlier period.

Smallpox Deaths in Scotland during the Year 1871.

Group of Districts.	Total Deaths.	Deaths under five years of age.	Deaths under five years of age, per cent. of total.
Principal towns (with population above 25,000)	886	195	22·0
Large towns (with population from 10,000 to 25,000) - - - - - - -	143	32	22·3
Small towns (with population from 2,000 to 10,000) - - - - - - -	209	55	26·3
Mainland, rural - - - - -	183	25	13·6
Insular, rural - - - - -	11	—	—
Scotland - - - - -	1,432	307	21·4

Similar information cannot yet be given for any subsequent year, the abstracts not being yet completed, except for the first group of districts, viz., the eight principal towns. But in them the results up to the entire termination of the epidemic at the end of June of the present year are exhibited in the following table :—

Smallpox Deaths in the Principal Towns of Scotland.

Years.	At all ages.	Under five years of age.	Deaths under five years of age per cent. of total deaths.
1871	886	195	22
1872	1,537	362	23·5
1873	467	124	26·5
1874 (to June inclusive.)*	302	69	22·8
Total $3\frac{1}{2}$ years	3,192	750	23·5

In the General Annual Report of the Registrar General for Scotland for 1872, the results for that year are thus commented on :—"If the same "relative mortality had taken place among children at that age (under "five years) as occurred during the previous epidemics, when they "were less efficiently protected by vaccination, instead of only "362 children under five years of age having died from smallpox in "the eight towns during 1872, 3,370 would have died. The enforce-"ment of the Vaccination Act therefore during the seven previous "years appears to have had the effect, in these eight towns alone, of saving the lives of upwards of 3,000 children."† Applying these observations to the whole period, there will have been a gain in the eight towns of nearly 7,000 lives under five years of age alone. It is then a very moderate calculation indeed that, but for the Vaccination Act, the total smallpox deaths in these towns from the epidemic would

* Only 54 deaths from smallpox were registered in these eight towns in the last six months of 1874.

† Eighteenth Annual Report on the Births, Deaths, and Marriages registered in Scotland during 1872; and Eighth Annual Report on Vaccination, p. 20–1. The Registrar General for Scotland publishes for each year two separate Annual Reports: (1) a General Annual Report, which appears a few months after the year has terminated; and (2) a Detailed Annual Report, which is the really important one for statistical purposes, but which usually does not appear for two or three years later.

(instead of amounting to only 3,192) have considerably exceeded 10,000.

Conclusions from comparison of the proportions of deaths from a particular disease at different ages require always to be drawn with caution, and with a full knowledge and appreciation of fallacies to which they may be liable. The scale of observation, however, in this case, is so large, and the result is in such exact correspondence with what our knowledge of the protective power of vaccination would lead us to expect, and with what has been the result of similar measures in England and in Ireland, that there can be no hesitation whatever in accepting the above as fairly measuring the effect the compulsory vaccination law has had, during this epidemic of smallpox in Scotland, in saving the lives of young children. It is by no means necessary, however, to rely on this evidence exclusively; for other proofs are at hand in a comparison of the mortality of young children in Scotland from the recent epidemic with that which has resulted *from the same epidemic* in foreign countries, which have either no compulsory vaccination law, or a compulsory law of a much less complete and effective kind. The places for which our present information is sufficiently complete to afford the material for such comparison with the chief towns of Scotland are Holland, the cities of Berlin and Leipsic, and the State of Hamburgh.

and as compared with the present mortality under that age abroad.

In Holland.

In Holland there is no general vaccination law, and the only check on the neglect of parents is a rule existing in some communes, and in some only (but by no means always applied, as I am informed, in many communes in which it nominally exists), that children must have been vaccinated before they can be admitted to the communal schools. Hence vaccination is habitually delayed, and children are much more generally than not above two years of age, and repeatedly six, seven, or more years old before they are taken to be vaccinated, if, indeed, vaccination be not omitted altogether.* If now we compare the deaths among children under five years of age in the chief towns of Scotland and Holland from the recent smallpox epidemic, during its two years of greatest prevalence in those towns, the following is the striking result:—

Groups of Towns compared.	Actual Smallpox Deaths under five years of age in the two years.	Smallpox Deaths under five years of age in the two years for equivalent populations of 1,000,000 of all ages.
Eight principal towns of Scotland in 1871 and 1872 (aggregate estimated mean population, 1,083,750) - - - -	**557**	**514**
Eight principal towns of Holland in 1870 and 1871 (aggregate population on December 31st, 1870, 693,080) - - -	**4,245**	**6,122**

* Of the primary vaccinations performed in the year 1872, at the Vaccine Institution at Rotterdam, considerably more than half were between the ages of two and ten years; and I find from a return for 1873 of the vaccinations practised in the different provinces of Holland, that out of a total of 133,931 vaccinations and revaccinations performed, there were but 31,843 under two years of age; 82,433 were in children between two and 10 years old; and the remainder in persons above 10 years old. (Verslag over het Geneeskundig Staatstoezight over 1873, p. 139.)

As, however, the epidemic continued, though with much diminished force, both in the towns of Scotland and of Holland beyond the periods comprised in the above table, it is necessary, and the more so that *relatively* the subsequent mortality was greater in the Scotch than in the Dutch towns, to extend the comparison, as accurately as we can, to the entire termination of the epidemic in each group. For the Scotch towns the figures are complete; and to the 557 deaths under five years of age in 1871 and 1872, we have to add 193 which occurred up to the end of June 1874. The returns from Holland, however, for 1872 are so far incomplete, that while showing a total of 382 smallpox deaths in the eight towns, they do not give the number of those deaths which were under five years of age. If, however, we assume the proportion to have been the same as in the two preceding years (and in this we cannot be far wrong), there would be 229 to be added to the 4,245 in the table, making the entire number for the three years 4,474 ; and the comparison would stand thus :—

Groups of Towns compared.	Actual (or estimated) Smallpox Deaths under five years of age in the entire periods compared.	Smallpox Deaths under five years of age in the entire periods compared for equivalent populations of 1,000,000 of all ages.
Eight principal towns of Scotland during the $3\frac{1}{2}$ years the epidemic subsisted - -	**750**	**692**
Eight principal towns of Holland during the 3 years the epidemic subsisted -	**4,474**	**6,455**

In Hamburgh, Leipsic, and Berlin.

In Hamburgh, as in Holland, there was not, at the time of this outbreak of smallpox, any compulsory vaccination law, nor any check on the negligence of parents except a requirement of certificate of vaccination before a child could be admitted to the " schools of the poor." In Saxony also, there was no direct compulsory law. In Prussia, however, such a law existed ; and as its provisions have apparently been much misunderstood in this country, it is important they should be explained. This law required that children should be vaccinated within one year of birth, *without, however, attaching any penalty to neglect, except in the cases in which smallpox followed such neglect.* But these were the very circumstances under which there was a natural indisposition to prosecute ; technical difficulties also not unfrequently arose about the prosecution; and the result was that prosecutions were seldom undertaken, and that while by most parents the law was duly obeyed, a great many were in the habit of risking it. The number of these latter had, as Dr. Guttstadt informs us in his official report, of late years considerably increased. Hence, when this epidemic broke out, large numbers of children were found in Berlin who had attained school age without vaccination having been performed ;* and it was to this accumulation of unvaccinated children that the high mortality of the epidemic in that city was, according to Dr. Guttstadt, in great measure attributable. When children in Prussia had attained the age for admission to the State

* Zeitschrift des Königlich Preussichen Statistischen Bureaus, 1873, p. 152. Laws for rendering the performance of vaccination directly compulsory have since been passed, I believe, both for Prussia and for Hamburgh.

schools, an important check came into operation, for they had then to produce the certificate of having been vaccinated.

Our information for Hamburgh, Leipsic, and Berlin supplies the ages at which the smallpox deaths occurred, and embraces for each of those places the whole period of epidemic prevalence. A comparison with the town populations of Scotland and Holland gives the following results :—

Towns or groups of Towns compared.	Actual Smallpox Deaths under five years of age during the whole period of the epidemic in each town or group of towns.	Smallpox Deaths under five years of age during the whole period of the epidemic for equivalent populations of 1,000,000 of all ages.
Eight principal towns of Scotland (population, 1,083,750), 1871–4 - - -	**750**	**692**
Berlin (population, 882,569), 1871 and 1872	**2,837**	**3,448**
Hamburgh (population, 338,974), 1871 and 1872 - - - - -	**1,938**	**5,717**
Leipzic (population, 106,925), 1871 - -	**659**	**6,200**
Eight principal towns of Holland (population, 693,080), 1870–2 - - -	**4,474**	**6,455**

The position occupied by Berlin is, as might be expected, intermediate between that of the Scotch Towns on the one hand, and Hamburgh, Leipsic, and the Dutch towns on the other.*

I regret that I have not the materials for comparing the smallpox mortality under five years of age in all these various towns or groups of towns with *the population living under that age* in them respectively. The only places for which I can do this are the towns of Scotland, Berlin, and Leipzic. The population living under five years of age in the eight towns of Scotland in 1872, the mid-period of the epidemic in that kingdom, was 147,433 ; the smallpox deaths under five years of age in the $3\frac{1}{2}$ years were 750 ; the annual rate was therefore 145 per hundred thousand children living under that age, continued for a period of $3\frac{1}{2}$ years.† The population living under five years of age in Berlin in 1871–2 was 88,093 ; the smallpox deaths in these years under five years of age were 2,837 ; the annual rate was therefore 1,600 per hundred thousand children living under that age, continued for a period of 2 years. The population living under five years of age in Leipzic in 1871 was 8,545 ; the epidemic began and ended in that year. Taking for comparison (as appears to me the correct way) the *entire* period of

* In some foreign towns the military form a large proportion of the population. If from the population of Leipzic in 1871, as given in the text (106, 925), the soldiers be deducted, the remaining inhabitants were only 89,326 in number. As it was among these that all the deaths under five years of age occurred, the proportion per million might more correctly be put down as 7,377 than as 6,200. This proportion, though higher than that of the Dutch towns in the aggregate, is not so high as that in some of them, for in Rotterdam the rate was 9,045, and at the Hague, 10,437 per million. (See L. Thomas, Beiträge zur Pocken-statistik inbesondere aus der Leipziger Epidemie, von 1871, in Archiv der Heilkunde, 1872. Dr. Thomas gives the smallpox deaths under five years of age in Leipzic as 680 ; but I adhere to the numbers (659) officially supplied to our Government, and have made my calculation accordingly.)

† In 1872, the year of *chief* prevalence of the epidemic, the smallpox deaths under five years of age did not exceed 245 per 100,000 children living under that age.

the epidemic in each place, and reducing the numbers to a common ratio, the account stands thus—

Towns or groups of Towns compared.	Population living under five years of age.	Smallpox Deaths under five years old during the entire period of the epidemic in each place.	Smallpox Deaths under five years of age during the whole period of the epidemic for equivalent populations of 100,000 children under that age.
Chief towns of Scotland ($3\frac{1}{2}$ years) - -	147,433	**750**	**508**
Berlin (2 years) - -	88,093	**2,837**	**3,200**
Leipzic (1 year) - -	8,545	**65**	**7,712**

So far then as comparison on the basis of special age rate, which is the best to take wherever it is attainable, differs from that made on the other and more generally attainable one, the difference is more marked in favour of the towns of Scotland.

Case of Dundee.

As Dundee was the town which of all the chief towns in Scotland had the highest proportionate infantile mortality from smallpox, it is necessary for completeness of our comparison to examine in detail the particulars respecting it. The mean population of Dundee for the two years during which it was subject to the influence of the epidemic (1871 and 1872) was estimated at 123,176, the population under five years of age being about 16,700; the average annual births of the two years were 4,597. The population is a rapidly increasing one, and there is much immigration. The epidemic struck the place with great severity, causing in the two years 674 deaths, of which 485 were in persons over five years of age and 189 in children under that age. The proportion of smallpox deaths under five years of age to the total smallpox mortality was therefore 28 per cent.; their ratio to the general population of the town for the whole period of the epidemic, 1,534 per million; and their ratio to the population living under five years of age 1,140 per hundred thousand. How far this excess of juvenile smallpox mortality over that of the towns of Scotland generally might be due to any local laxity in the administration of the acts (for of course the law is not everywhere administered with equal precision); how far it might be due to immigration of parents with unvaccinated children from other parts of Scotland (portion, for instance, of the $2\frac{1}{2}$ per cent. of births annually lost sight of), or from England, or from Ireland; how far to excessive exposure of the young infants to infection from overcrowding, &c.—all these are matters which could only be properly determined by local inquiry. What it concerns us particularly to note in connection with our present argument is, that even in this town, in which the juvenile smallpox mortality was proportionally the greatest, the ratio of deaths under five years of age to population living under that age was not very much more than a third that which occurred in Berlin (1,140 per hundred thousand as compared with 3,200 per hundred thousand), and not very much more than a seventh that which occurred in Leipzic (7,712 per hundred thousand): while the ratio of the smallpox mortality in the three towns among persons *above* five years of age was very nearly the same in each. So also with regard to those foreign towns, the comparison

with which I am obliged to base on the ratio which the deaths under five years of age bear to *the whole* population, the proportion of these in Dundee (1,534 per million) was little more than a quarter that of Hamburgh, not nearly a quarter that of the chief towns of Holland taken collectively, about a sixth that of Rotterdam (9045 per million), and less than a seventh that of the Hague (10,437 per million).

Mortality of the epidemic in Scotland above the age of five years.

The proportion of the population of Scotland above five years of age which has been born since the Vaccination Act came into force is at present small; but it augments year by year, and in the course of years an almost entirely vaccinated population will, if I may so say, have been *built up*. Already the proportion is sufficient to have made a noticeable difference in the relative number of smallpox deaths occurring among those above 5 and under 20 years of age on the one hand, and among those above 20 years of age on the other.* Up to the year 1864, 49 per cent. of those smallpox deaths in Scotland which occurred above five years of age took place between the ages of 5 and 20 years, and 51 per cent. over 20 years; but from 1871 to 1873 only 40 per cent., and in the last of those three years (1873) only 33 per cent., were between 5 and 20 years of age, the proportion above 20 years of age being 60 per cent. and 67 per cent. respectively.

The number of deaths which occurred from this epidemic in the eight chief towns of Scotland taken in the aggregate at ages *above* five years (2,442) was smaller, and even considerably smaller, proportionately to population, than that which occurred in the corresponding group of towns in Holland; and this holds good, though to a less extent, if the comparison be made between the towns in each kingdom which were the most severely stricken. Thus, if Edinburgh, Dundee, and Leith—the three towns in Scotland which had the highest rate of smallpox mortality—be compared with Rotterdam, the Hague, and Utrecht, the smallpox deaths *above* five years of age per million of total population were in the former 3,412, 3,937, and 5,008 respectively, and in the latter 5,634, 6,008, and 7,160 respectively. The mean of the former (4,119) corresponds very nearly with the rates in Berlin (4,426) and Leipzic (3,572),† where there is, I believe, strict application of the rule requiring vaccination before children can enter the schools: that of the latter (6,407) is somewhat higher than the rate for Hamburgh (5,980). The favourable position of the Scotch towns in comparison with these latter towns is doubtless in great measure due to the number of protected *children above* five years of age in Scotland, the result, direct and indirect, of the Compulsory Vaccination Act. But whatever difference may be noticeable between the towns of Scotland and the towns abroad in regard to smallpox deaths *above* the age of five years, this, it will be observed, is quite insignificant in comparison with the difference in regard to deaths *under* that age. It is the practice of vaccination in Scotland *in early infancy* which has been the main cause of the comparatively small mortality which that kingdom has suffered during the recent epidemic.

Provisions and working of the law in Ireland.

(*b.*) Ireland.—The Compulsory Vaccination Act for Ireland came into operation at the same date as that for Scotland. As it is without

* There is every probability that the effect of the Compulsory Vaccination Act in Scotland was not wholly limited to the children born subject to its provisions, but that, as is known to have been the case in England and Ireland, it extended to many of the children previously born.

† A rate which, it must be observed, would have been about 4,200 but for the large proportion of military, who having been all, or nearly all, *revaccinated* had scarcely any smallpox mortality.

that effective machinery for registering compliances which the Scotch Act provides, it is impossible to give the same systematic account of its working from year to year. We must put up with the best approximate evidence that can be got; and this is quite sufficient to show on the whole a remarkable degree of success, not, however, without some serious drawbacks. The vaccination of Ireland is chiefly done, and probably except in towns of some size almost wholly done, by the Public Vaccinators, who of course supply to the Local Government Board for Ireland (formerly to the Poor Law Commissioners for Ireland) annual returns of their proceedings. From comparison of these annual returns with the registered births for the eight years from 1865 to 1872 inclusive, it appears that upwards of 81 per cent. of the births were vaccinated by the public vaccinators, the births registered during those years having been 1,179,714, and the public vaccinations performed during the same years *of children born since January* 1, 1864, having been 962,660. But as the registration of births in Ireland is far from complete, the proportion of public vaccinations to *actual* births must be less than that above indicated; and probably the residuum to be accounted for would be much nearer 24 or 25 per cent. of the children born than the 19 per cent. left on the above statement. This residuum would comprise all the children who had died without having been vaccinated; all who had been vaccinated by private practitioners (and these, at least in towns such as Dublin, Belfast, Cork, &c., would amount to a considerable number); all whose vaccination had been lawfully postponed; and an indeterminate number who would unlawfully have remained unvaccinated. The public returns disclose one great blot which has been severely commented on by the Commissioners, viz., that in a large number of cases the vaccination, which should have been performed within six months of birth, does not take place till the children are more than a year old. In 1872 there were no fewer than 33,440 cases of children under the provisions of the Act who were not vaccinated till they were more than a year old; and in 1873 there were 19,258 such cases. One necessary result of this is that the proportion to be told off each year as having died without vaccination is very much larger than the $8\frac{1}{2}$ per cent. which is the ascertained average of such cases in Scotland, or the $9\frac{1}{2}$ per cent. which was returned for England in 1872. There can be no reasonable doubt, I think, that of the 24 or 25 per cent. of the annual births of Ireland not vaccinated by the public vaccinators, more, and perhaps considerably more, than one half may be put down as having died without vaccination. It would be mere guess work to estimate, of the remaining 10 to 12 per cent. or thereabouts, how many had been vaccinated or how many might have escaped vaccination. But as in this remnant all the private vaccinations done in the kingdom are included, it is very certain that a considerable portion must have been vaccinated.

Evidently then the Vaccination Act for Ireland does not work with the same precision as that for Scotland. Not only is its machinery radically defective in not providing an efficient system of registration, but for want of local officers whose prescribed duty it is, as in Scotland and in England, to warn each parent when the limit of time fixed for compliance has been attained, and to take the necessary steps then for seeing that the vaccination is duly performed, there is a great deal of dangerous postponement and neglect. With these defects it is more surprising to note what the Act has accomplished than what it has failed in, and the general success which, under the energetic administration of the Commissioners, it has achieved.

App. No. 5.

On Smallpox in its relation to Vaccination and the Vaccination Laws.

The following is the estimate, which the Commissioners, writing in the spring of 1871, in immediate anticipation of the extension to Ireland of the great smallpox epidemic, already widely prevalent in England, give of the state of protection of the Irish population. "It should," they say, "constantly be borne in mind that notwithstanding the satisfactory progress, with the exception of one year, of infant vaccination since 1864, there is still a considerable number of children born each year remaining unvaccinated; and that among the population born before 1864, there is a larger proportion than of infants unprotected. It is certain that if any of these come in contact with and contract this most contagious disease it will destroy life in a very considerable proportion of the cases of attack."* There can be no doubt that in 1871 and 1872 great energy was displayed in clearing away arrears which had existed. The general distribution of the population of the country, so small a relative proportion of which is concentrated in towns, was favourable to this being done in most places in time to prevent serious danger. But a risk was run which need not have been, and should not again be, encountered. A few simple alterations of the machinery of the law would prevent that constant recurrence of arrears which, from the vaccination returns of 1873, it is evident is still going on, and which, while it is permitted, must be a constant source of anxiety and danger.

Its effect on the smallpox mortality of children under the age of five years,

as compared with former mortality in Ireland under that age,

Before the Vaccination Act of 1863 the neglect of infantile vaccination in Ireland had been extreme. At the time the Epidemiological Society made its report in 1853, 79 per cent. of the smallpox mortality of that country was in children under the age of five years; and though, under the Medical Charities Act and an Act subsequently passed in 1858, there had been, through the instrumentality of the Public Vaccinators, an increase since then in the amount of vaccinations performed, this had not been sufficient to reduce the proportion of smallpox deaths under five years of age below 75 per cent. up to the time when the Compulsory Act of 1863 came into operation. In 1865 and 1866, by the operation of that Act, the proportion declined to about 50 per cent. The next four years were years in which smallpox was almost entirely absent from Ireland. But when the disease returned in 1871, by which time the population up to seven years of age had come within the provisions of the compulsory law, the proportion of smallpox deaths under five years of age was found to have fallen to about the same extent as those in Scotland under the operation of a similar law:

Smallpox Deaths in Ireland during the years 1871 and 1872.

Year.	At all ages.	Under five years of age.	Deaths under five years of age, per cent. of total deaths.
1871 - -	665	135	20·5
1872 - -	3,248	821	25
Total - -	3,913	956	24·4

* Twenty-fourth Annual Report of the Commissioners for administering the Laws for the Relief of the Poor in Ireland, p. 38.

In the City of Dublin, in which the total deaths from the epidemic in the two years during which it prevailed were 1,557, the number of those deaths under five years of age was 362, or 23 per cent., about the same proportion as in the principal towns of Scotland. I am unable to give the proportion which these 362 deaths bear to the population living under five years of age; but their proportion to the total population of Dublin (314,666) represents 1,150 deaths from the entire epidemic per million as compared with 692 in the eight principal towns of Scotland taken together, 1,534 in the town of Dundee, 3,448 in Berlin, 5,717 in Hamburgh, 6,200 in Leipsic, and 6,455 in the chief towns of Holland.

and with present mortality under that age abroad.

The effects of the Compulsory Vaccination Act for Ireland were not limited to the children born subject to its provisions. "The Act," say the Commissioners, "though applying in its compulsory provisions only "to children born [on or] after that date [Jan. 1, 1864] was practically "accepted as imposing an obligation in regard to children born previously: "and in the first year a large number of persons, viz., 166,456 not really "within the scope of the Act were vaccinated under it [by the public "vaccinators], and in succeeding years this operation continued; and this "class of subjects, although necessarily diminishing each year, is still a "considerable one."* To this result, no doubt, the existence of a system of public vaccination, for the performance, at the public cost and without any expense to individuals, of vaccination on all who duly apply for it at the public stations, by vaccinators whose rate of payment is regulated by the number of vaccinations done by them, largely contributed. Thus year by year the population of Ireland has been rapidly becoming a more and more protected one; and the consequent decline exhibited in the smallpox mortality of the kingdom affords probably the most remarkable example that exists of what sound legislation and good administration may effect in the saving of human life.

General effect produced by the compulsory law on the smallpox mortality of Ireland.

A little more than thirty years ago, at the census of Ireland for 1841, smallpox was ascertained to have been the second most fatal disease in the kingdom during the preceding ten years. The deaths from it in that period had been no fewer than 58,000. At the census of 1851 it was found to have been the third most fatal disease. The annual average deaths from smallpox in Ireland for 19 years preceding the Act of 1863 were, as shown in a table given in the Twenty-first Annual Report of the Poor Law Commissioners for Ireland, 2,644, the highest number of deaths in any of those years having been 6,436, and the lowest, 863.† The Compulsory Vaccination Act of 1863 came into operation at the decline of a considerable smallpox epidemic, and during the first year of its operation, before there was time for its results to be more than very partially manifested, the smallpox deaths were 854. From that time they declined in a manner without precedent in the history of Ireland to 347, 187, 20, 19, 20, and 32 in the six years from 1865 to 1870 inclusive. In 1871 the first wave of the recent epidemic was felt, causing the deaths to rise to 665; in 1872 they rose further to 3,248. In the first two quarters of 1873 they had declined to 379, and in the next quarter the epidemic had virtually ceased, the deaths registered during that quarter (the third of 1873), being 30 only. In comparing the smallpox mortality of the two periods before and after the compulsory Act, the decrease of population which has gradually been

---

* Twenty-first Annual Report of the Commissioners for administering the Laws for Relief of the Poor in Ireland, page 31.

† Ibid.

going on in Ireland must be borne in mind, and in the subjoined table* and accompanying diagram I have made the necessary correction for this. The upper line on the diagram shows what the actual mortality for each of the years compared was; the shaded portion what proportionately it would have been had the population of the year been the same as the population of 1871. It will be seen that the *average annual* smallpox mortality of the period since the compulsory law came into operation, *including the recent epidemic*, has not been nearly a third of the (corrected) annual average of 19 years previous, and has not, in fact, approached the lowest mortality exhibited in any one of those years; or, taking the last 10 only of the 19 years, and thus excluding the great epidemic of 1846–50, that it has not been even half the annual average of those 10 years, nor approached the lowest mortality exhibited in any one of them. The 4,292 deaths caused by the recent epidemic itself were not nearly a quarter of those (18,387 as corrected for population) caused by the epidemic of 1846–50. These 4,292 deaths were spread over two and a half years, and are equivalent to an annual average of 1,717 deaths for the time the epidemic lasted,—a number which, if com-

* Table showing the annual smallpox mortality of Ireland for two periods: A, for 19 years previous to the Compulsory Vaccination Act; B, for 10 years subsequent to that Act: with correction each year for diminution of population.

A. 19 years previous to Compulsory Act.			B. 10 years subsequent to Compulsory Act.		
Year.	Actual Smallpox Deaths.	Estimated Smallpox Deaths if population of each year had been the same as in 1871.	Year.	Actual Smallpox Deaths.	Estimated Smallpox Deaths if population of each year had been the same as in 1871.
1842	2,743	1,801	1864	854	816
1843	2,682	1,758	1865	347	332
1844	2,453	1,598	1866	187	182
1845	3,045	1,980	1867	20	19·6
1846	3,730	2,428	1868	19	18·7
1847	5,197	3,494	1869	20	19·8
1848	5,750	4,060	1870	32	31·8
1849	6,436	4,785	1871	665	665
1850	4,634	3,620	1872	3,248	3,261
1851	1,865	1,544	1873	481	481 (a)
1852	1,767	1,504			
1853	1,419	1,228	Average of 10 years		583
1854	1,510	1,339			
1855	1,466	1,314			
1856	1,651	1,491			
1857	1,084	988			
1858	903	827			
1859	1,048	963			
1860	863	799			
Average of 19 years		1,972			

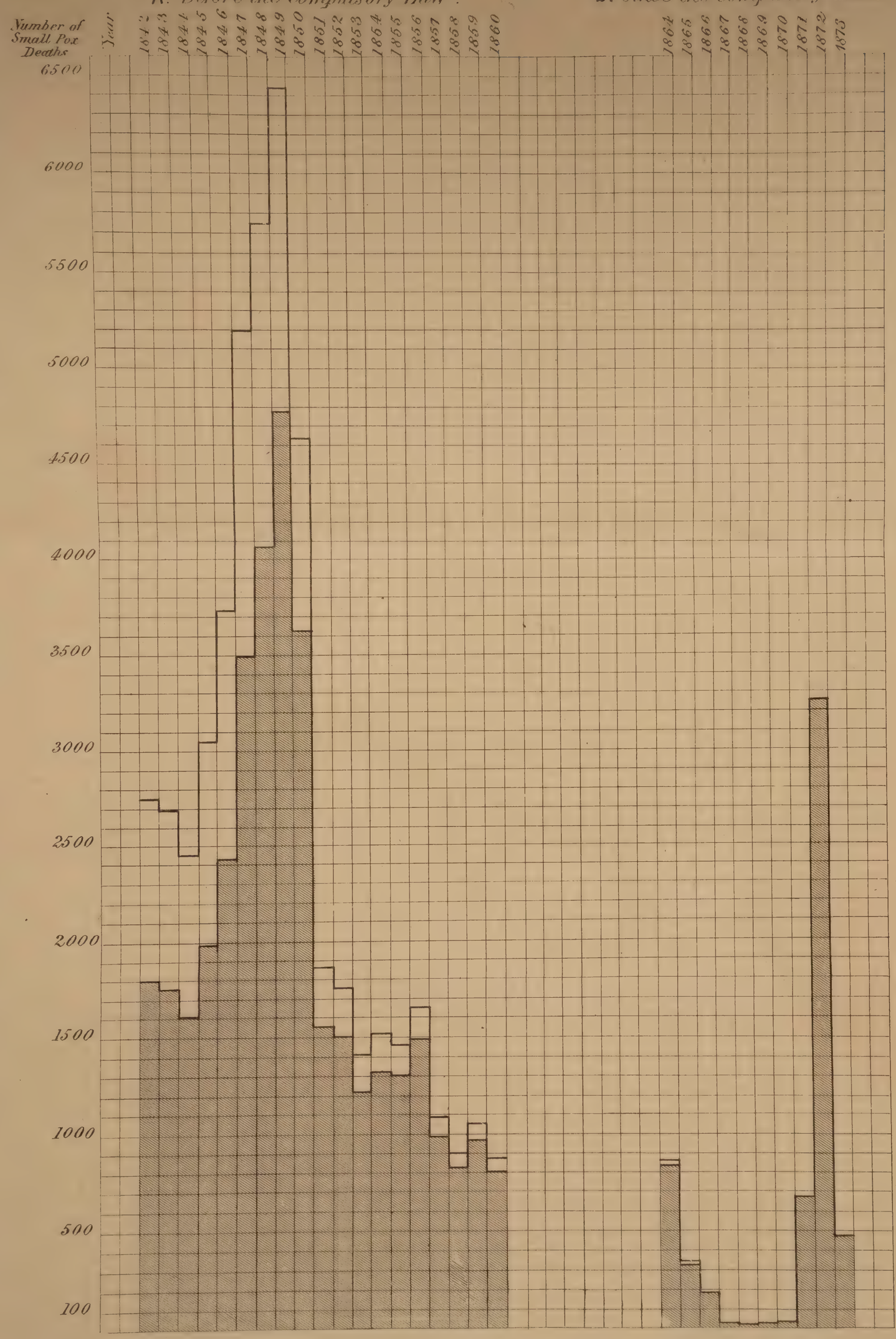
(a) I have not the data for making estimate for this year.

The number of deaths, however, given for period A is very far short of the number which actually occurred within the period, for it is simply the number which, on inquiry at each decennial census, was ascertained to have died of smallpox during the preceding decennium, and, as the Census Commissioners observe, does not include the deaths which had taken place in families who in the course of the ten years had emigrated or died out, or who had ceased to be independent occupiers. Systematic death registration was established in Ireland in 1863, and the numbers for period B are from the Registrar General's returns. There is no return of deaths in Ireland for the years 1861 to 1863 inclusive, but, as stated in the text, smallpox was during those years severely fatal.

Annual Small Pox Mortality in Ireland arranged in two periods.

A. *Before the compulsory Law.*

B. *Since the compulsory Law.*



The Upper line shews the Actual number of Smallpox Deaths in each year, the shaded portion the proportionate number for each year on a population the same as was enumerated in 1871.

Dangerfield, Lith. London.

pared with *the annual average of the whole of the former period*, made up as it is of epidemic and non-epidemic years, falls considerably short of it. When the peculiar intensity of the recent epidemic is borne in mind, an intensity which, as the hospital records of Ireland show, was not less manifested there than elsewhere in the large proportion of malignant, black, and hæmorrhagic cases, these results must certainly be regarded as very remarkable.

But that these deaths would have been still much fewer had there been that complete state of vaccination which it is the purpose of the law to attain, no reasonable person can doubt. The Commissioners' statement that, apart from the delay in the vaccination of young children, there are many adolescents and adults still unprotected, must not be lost sight of. If these be aggregated in any place, they constitute a great danger to that place, and whenever the infection of smallpox finds its way in, a high local death-rate from that cause may be expected to ensue.

Provisions and working of the laws in England.

(c.) England. The Compulsory Vaccination Act of 1853 was to a considerable extent an experimental Act, and was very imperfect in its provisions. The machinery provided by it for the registration of compliances was inefficient, so that no precise statement of its effects in securing the vaccination of young children can be given ; and it did not specifically impose on any local authority the duty of seeing that its requirements were carried out. Still there is abundant evidence of its having been largely effective. The mere fact that the law required the vaccination of children to be done within a prescribed period from birth, and if it were not so done, rendered parents liable to a penalty, was sufficient to induce compliance on the part of the bulk of the population ; and the number of *infantile* vaccinations annually performed by the Public Vaccinators (by whom in England much the greater part of all the vaccination of the country is done) was at once and permanently doubled. The result on the smallpox mortality of the kingdom was seen in a speedy diminution of the average annual death rate ; and the smallpox deaths under five years of age, which up to 1853 had constituted 75 per cent. of the deaths from that cause at all ages, were in a very few years reduced to 55 per cent. ; the proportion in Ireland and Scotland remaining at 75 per cent., as we have seen, until 10 years later, when those divisions of the United Kingdom also came under a compulsory vaccination law. From the point thus attained in England no further reduction in the proportionate juvenile mortality from smallpox took place until the Acts of 1867 and 1871. By the former of these Acts (the Vaccination Act, 1867), which came in force on the 1st of January 1868, a proper machinery for registering compliances with the law was established: and the respective Boards of Guardians throughout the kingdom were required to see that such compliances took place, and *authorized* to appoint officers whose duty it should be to institute inquiries, issue warnings, and take proceedings for that purpose. By the latter (the Vaccination Act, 1871), they were *required* to appoint such officers. When the recent smallpox epidemic burst forth, towards the end of 1870, only a portion of the population under five years of age in England was within the operation of the Act of 1867 ; during the continuance of the epidemic a larger proportion came under its provisions, and some came also under the provisions of the Act of 1871. The result was manifested in a reduction of the proportionate smallpox mortality under five years of age from 55 per cent. of the entire mortality from that cause to $33\frac{1}{2}$ per cent. in 1871, and to 30 per cent. in 1872.

Effect of the law of 1853 on the smallpox mortality under the age of five years.

Further effect of the Acts of, 1867 and 1871

The Act of 1867, being in some of its most important requirements permissive only, had been carried out with very various degrees of efficiency by different local authorities. In those places in which the action taken under it had been tardy and ineffective, the mortality in the young children amounted to, or approached, its old proportions: in those places in which such action had been commenced immediately on the Act coming into operation, and been steadily continued, a remarkable diminution in that proportion was observed.

illustrated by reference to the Metropolitan unions:

Respecting, first the Metropolis, the accompanying table, (for the means of constructing which I must express my great obligation to the Managers of the Metropolitan Asylum District, and to Mr. Marson of the London Smallpox and Vaccination Hospital,) by distributing the smallpox deaths which occurred in the various hospitals of London to the unions from which the cases were sent in, shows to what extent each union contributed to the general mortality from that cause, and what in each was the proportion of deaths under five years of age. In one union only, that of Bethnal Green, did this proportion remain at the average of the period preceding the Act of 1867: this was a union which had been the subject of repeated official remonstrances for its neglect properly to carry that Act into effect, and which indeed did not till quite a late period of the epidemic take really effective steps for the purpose.* Another union, St. George's, Southwark, would have shared the unenviable position of Bethnal Green, but that by its incorporation in the St. Saviour's Union shortly before the smallpox outbreak, its high relative juvenile mortality is not exhibited in the table. "We've done nothing, sir, and we don't intend to do anything," was the reply of the Clerk of St. George's, Southwark, to the inquiries made of him as to steps taken in administration of the Vaccination Act of 1867: in this division of the St. Saviour's Union the smallpox deaths under five years of age in 1870 and 1871 were 60 per cent. of the whole. The unfavourable position, again, which St. George's, Hanover Square, holds in the table among the western group of unions is chiefly due to the then recent incorporation with it of the former union of St. Margaret and St. John, Westminster, in which, beyond the voluntary action of one of the registrars, no steps in execution of the Act of 1867 had been taken.

Except Bethnal Green, every one of the metropolitan unions, as at present constituted, exhibited a marked diminution in the proportionate smallpox mortality among young children as compared with that existing before the Act of 1867. Putting aside Bethnal Green, the deaths under five years of age ranged in the respective unions from 43·4 to 28·6 per cent. of the whole smallpox mortality in the more strictly Metropolitan Unions, and to a less proportion than this in the suburban Unions of Lewisham and Hampstead: the proportion for the entire metropolis being 36·7 per cent. The saving of young life which this reduced proportion implies is very great; and it would obviously have been much greater than it actually was, had the law of 1867 been from the first efficiently administered over the whole metropolis, and had it been long enough in operation to bring within its influence children up to the full age of five years. In regard to this latter point the Vaccination Officer of St. Luke's, Middlesex, a division of the Holborn Union, in which the Act of 1867 had been administered with great efficiency, and in which

* I speak, it must be fully understood, historically. I am not aware that there is any subject for complaint in the present administration of the Vaccination Acts in Bethnal Green.

SMALLPOX DEATHS of PERSONS resident in each of the METROPOLITAN UNIONS in each of the YEARS 1871 and 1872, distinguishing the DEATHS under FIVE YEARS of AGE.

UNION.	Total Population in 1871.	Population in 1871 under five years of age.	1871. Smallpox Deaths at all ages. In District.	In Asylum Hospitals.	In Smallpox Hospital.	Total.	1871. Smallpox Deaths under five years of age. In District.	In Asylum Hospitals.	In Smallpox Hospital.	Total.	1872. Smallpox Deaths at all ages. In District.	In Asylum Hospitals.	In Smallpox Hospital.	Total.	1872. Smallpox Deaths under five years of age. In District.	In Asylum Hospitals.	In Smallpox Hospital.	Total.	Proportion per cent. of Smallpox Deaths under five years of age to Smallpox Deaths at all ages in 1871 and 1872.	Total Smallpox Deaths in 1871 and 1872 (combined) per 1,000,000 of population.	Smallpox Deaths under five years of age in 1871 and 1872 (combined) per 100,000 children livingunder that age.	UNION.
Paddington	283,153	34,084	54	52	2	108	78	10	—	105	8	5	1	14	26	—	—	31	30·4	1,585	399	Paddington.
Kensington			64	65	3	132		14	—		39	30	2	71		4	—					Kensington.
Fulham			64	27	13	104		3	—		12	4	3	19		1	—					Fulham.
Chelsea	71,089	8,631	64	58	8	130	31	7	—	38	26	17	2	45	11	1	—	12	28·6	2,462	579	Chelsea.
St. George, Hanover Square.	155,936	15,725	354	89	8	451	170	20	—	190	12	12	—	24	1	1	—	2	40·0	3,046	1,231	St. George, Hanover Square.
Westminster	51,181	5,220	27	27	3	57	10	5	—	15	6	4	1	11	3	2	—	5	29·4	1,329	383	Westminster.
Marylebone	159,254	17,209	132	143	4	279	60	33	—	93	31	34	5	70	15	12	—	27	34·4	2,122	692	Marylebone.
Hampstead	32,281	3,470	25	41	4	70	3	7	—	10	3	7	1	11	1	1	—	2	14·8	2,509	346	Hampstead.
Pancras	221,465	28,355	450	269	43	762	210	43	—	253	58	33	7	98	30	3	—	33	33·2	3,883	1,009	Pancras.
Islington	213,778	28,701	320	125	18	463	125	14	—	139	36	18	5	59	18	2	—	20	30·4	2,441	554	Islington.
Hackney	124,951	16,134	303	104	1	408	125	17	—	142	96	32	—	128	52	2	—	54	30·8	4,290	1,215	Hackney.
St. Giles	53,556	5,895	44	46	3	93	24	10	—	34	9	4	—	13	3	1	—	4	35·8	1,979	645	St. Giles.
Strand	41,339	4,041	35	41	3	79	10	16	—	26	4	4	—	8	2	—	—	2	32·2	2,104	693	Strand.
Holborn	163,491	21,033	209	158	3	370	70	31	—	101	38	41	—	79	20	9	—	29	28·9	2,746	613	Holborn.
City of London	75,983	7,321	78	27	11	116	35	4	—	39	21	24	2	47	9	5	—	14	32·6	2,145	724	City of London.
Shoreditch	127,164	18,236	442	127	1	570	221	26	—	247	32	14	2	48	15	—	—	15	41·8	4,860	1,414	Shoreditch.
Bethnal Green	120,104	18,142	379	155	—	534	243	53	—	296	82	40	—	122	59	10	—	69	55·7	5,462	2,012	Bethnal Green.
Whitechapel	76,573	9,677	159	65	1	225	89	8	—	97	18	15	—	33	11	2	—	13	42·6	3,369	1,137	Whitechapel.
St. George-in-the East.	48,052	6,685	62	21	17	100	39	1	1	41	7	15	—	22	2	1	—	3	36	2,539	668	St. George-in-the East.
Stepney	57,690	8,106	77	41	—	118	32	6	—	38	17	17	—	34	8	2	—	10	31·5	2,461	592	Stepney.
Mile End Old Town	93,152	13,666	169	43	—	212	77	2	—	79	35	16	1	52	13	1	—	14	35·2	2,834	680	Mile End Old Town.
Poplar	116,376	17,861	165	55	—	220	69	10	—	79	183	27	—	210	82	2	—	84	37·9	3,695	912	Poplar.
St. Saviour's	175,049	23,922	457	186	1	644	233	35	—	268	65	33	—	98	49	5	—	54	43·4	4,239	1,346	St. Saviour's.
St. Olave's	122,398	18,301	278	45	—	323	123	4	—	127	33	14	1	48	10	2	—	12	37·5	3,031	759	St. Olave's.
Lambeth	208,342	28,367	319	190	1	510	132	22	—	154	96	58	—	154	44	3	—	47	30·3	3,138	708	Lambeth.
Wandsworth	125,060	17,616	380	106	1	487	192	6	—	198	25	14	—	39	12	—	—	12	39·9	4,206	1,193	Wandsworth.
Camberwell	111,306	15,720	153	58	—	211	66	4	—	70	42	28	—	70	22	1	—	23	33·0	2,524	591	Camberwell.
Greenwich	100,600	13,963	71	31	—	102	38	3	—	41	38	23	1	62	20	1	—	21	37·8	1,630	444	Greenwich.
Lewisham	51,557	6,437	10	13	2	25	3	1	—	4	7	5	1	13	2	1	—	3	18·4	737	109	Lewisham.
Woolwich	73,380	10,110	39	10	—	49	21	—	—	21	47	14	—	61	20	1	—	21	38·2	1,499	415	Woolwich.
Patients from extra-Metropolitan Unions sent to London Smallpox Hospital.	—	—	—	—	30	30	—	—	—	—	—	—	11	11	—	—	—	—	—	—	—	Patients from extra-Metropolitan Unions sent to London Smallpox Hospital.
Whole Metropolis	3,254,260	422,629	5,383	2,418	181	7,982	2,529	415	1	2,945	1,126	602	46	1,774	560	76	—	636	36·7	2,970	847	Whole Metropolis.

*** The numbers in this Table for the whole Metropolis do not exactly correspond with those in the Registrar General's Returns: (1) because in the Return from the Asylum District the deaths which occurred in the Hampstead Hospital in the last few weeks of 1870 are included, and could not easily be separated; and (2) because the Returns both from the Asylum District and from the London Smallpox Hospital are of deaths *which occurred* within each year, while the Registrar General's Returns are of deaths *registered* within the year. The smallpox deaths, therefore, in the Table for 1871 are somewhat in excess of those published by the Registrar General: those for 1872, a little below. The difference is quite immaterial for any conclusions; I simply note that there *is* a difference.

51 smallpox deaths under five years of age were registered in the years 1871 and 1872, was good enough to make at my request specific inquiries respecting them and ascertained that 17, or exactly one third, were in children born before the Act of 1867 came into operation.*

and to other unions.

As in the metropolis, so in England generally, there were but few unions in which there was not a diminution from the proportion which the deaths under five years of age had borne to the total mortality before the Act of 1867: but the difference was very marked between unions in which the execution of that Act had been defective, as in the unions of Sunderland, South Shields, Dudley, or Walsall, in all of which the proportion remained above 40 per cent., and unions in which it had been well administered, as in Manchester, where the proportion was only 25 per cent., or Leeds, where it was less than 19 per cent. In that part indeed of the union of Leeds which constitutes the *township*, and is the most thickly inhabited, but in which the Act of 1867 had, from the time it came into operation, been carried out by a most efficient Officer, with model care and exactitude, the proportion was but 17 per cent.†

The total smallpox deaths in England under five years of age were 7,770 in 1871, and 5,758 in 1872. The only European State from which we have the full information requisite for instituting a comparison with this mortality is Holland. The result is as follows :—

---

* Of the remaining 34 deaths, 12 were in children under three months old, and four in children who, though more than three months old when they died, had probably contracted the smallpox before attaining that age. Only 18 were in children who could be ascertained to have been born subject to the provisions of the Act, and of these 10 had been born in other places and migrated into the parish of St. Luke's. So that eight deaths of children under five years old, born in the parish and subject to the provisions of the Act, was the outcome of the two years' prevalence of this epidemic in the parish (population 54,069,) during which time it had been extremely fatal among elder children and adults. In the Parliamentary Return, relating to the mortality of England, 1851–60, St. Luke's had a higher smallpox death rate of children under five years of age than any other Metropolitan Union, with one exception. The contrast speaks for itself.

† And of these, little more than one half were in children born within the township The facts are so important and so instructive as to deserve mention in detail. The total smallpox deaths in the township of Leeds in 1871 and 1872 were 229, of which 39 only (or 17 per cent. as stated in the text) were under five years of age. A detailed inquiry, made subsequently at my request, respecting these 39 deaths, showed that 18 of them (12 admitted to be unvaccinated, 2 respecting whom vaccination was asserted, but without certificate, and without any particulars which would allow the statement being verified, and 4 respecting whom no particulars could be ascertained,) were in children who had been born out of the township. Of the 21 who had been born within the township, 14 were children (all unvaccinated) not within the provisions of the Act, 12 of them not having arrived at the age at which vaccination can be compelled and 2 of them having been born before the Act came into operation. There thus remain only 7 deaths of children born within the township and subject to the provisions of the Act: of these, 2 were children whose births had not been registered, and whom therefore there had been no means of tracing ; 3 were children whose vaccination had been postponed by medical certificate ; 1 was a child said by its parents to have been vaccinated, but of whose vaccination there was no medical certificate ; and there remained only a single case of a child medically certified as vaccinated. As the births of this district exceed 5,500 per annum, that is to say, as there were above 11,000 births during the period this severe epidemic lasted, the result not only reflects the highest credit on the officer, but illustrates in a remarkable manner the control which may be maintained over the smallpox mortality of the young by an efficient execution of the law.

App. No. 5.

On Smallpox in its relation to Vaccination and the Vaccination Laws.

The smallpox mortality under five years of age in England as compared with that of Holland,

Kingdom.	Population in 1871.	Actual Smallpox Deaths under five years of age in 1871 and 1872.	Smallpox Deaths under five years of age in the two years for equivalent populations of 1,000,000 of all ages.
England -	22,712,266	**13,528**	**596**
Holland -	3,632,237	**9,356**	**2,548**

and in the chief towns of England as compared with that of various towns abroad.

But for particular town populations we have the material for extending our comparison beyond Holland. The smallpox deaths under five years of age in London from the last quarter of 1870 to the end of 1872 inclusive were 3,842, a number which for the entire period is equal to 1,180 deaths per million of population at all ages. In the 17 unions of England which most nearly correspond to the 17 largest towns next after the metropolis, and which comprised at the census of 1871 a population of 2,446,353, there occurred 2,620 deaths under five years of age in the years 1871 and 1872, to which if we add 268, the number estimated as having occurred under that age (see footnote) in the same unions throughout 1873 and up to the end of the third quarter of 1874 inclusive, a total is attained of deaths resulting from the epidemic of 2,888, or exactly 1,180 per million of population at all ages.* The comparison with the chief towns of Scotland

* The following return is for the *unions, not for the towns*, of the respective names, of which towns in many instances the unions form but parts. The Registrar General was able readily to supply the deaths under five years of age for the former; it would have caused much trouble to supply them for the latter, and for the purposes of the comparison proposed, it was not at all necessary that that trouble should be incurred :—

Union.	Total Population in 1871.	Population under five years of age in 1871.	Smallpox Deaths at all ages in 1871 and 1872.	Smallpox Deaths under five years of age in 1871 and 1872.	Total Smallpox Deaths in the two years (combined) per 1,000,000 of population.	Smallpox Deaths under five years of age in the two years (combined) per 1,000,000 of population at all ages.	Smallpox Deaths under five years of age in the two years combined per 100,000 children living under that age.
Portsea Island - -	113,595	14,847	549	133	4,837	1,171	895
Norwich - - -	80,386	9,919	563	142	7,004	1,766	1,437
Bristol - - -	62,662	7,397	83	23	1,323	367	311
Wolverhampton -	136,053	19,904	722	216	5,307	1588	1,085
Birmingham - -	231,015	31,901	310	70	1,341	303	225
Leicester - - -	95,220	12,953	321	111	3,371	1,166	857
Nottingham - -	86,621	9,828	348	101	4,017	1,166	1,028
Liverpool - - -	238,411	28,497	831	346	3,444	1,451	1,414
Manchester - -	251,956	33,298	321	81	1,234	321	243
Salford - - -	128,890	18,251	269	92	1,311	714	505
Oldham - - -	126,982	17,589	92	33	709	260	187
Bradford - - -	257,713	34,586	89	24	345	93	69
Leeds - - -	162,421	22,393	235	44	1,448	271	196
Sheffield - - -	162,271	24,256	874	426	5,385	2,625	1,760
Hull - - -	68,316	9,026	179	59	2,620	864	665
Sunderland - -	112,643	16,746	1,005	432	8,922	3,870	2,609
Newcastle-on-Tyne -	131,198	18,642	835	287	6,357	2,187	1,539
Total - -	2,446,353	330,033	7,626	2,620	3127	1071	790

In the above Unions there were 329 deaths from smallpox in 1873, and 473 in the first three quarters of 1874 If the proportion of deaths under five years of age were the same as in 1871 and 1872, 268 of these deaths would have been under five years of age, and 534 over the age of five years. A large number of these deaths in 1873 and 1874 ought not really to be included as part of the epidemic; they were mere casual cases in Unions in which there was nothing like an outbreak. But I have preferred to include the whole of them to prevent any cavil being raised, as in the union which contributed the largest number (Birmingham) smallpox was really epidemic.

In the *Borough* of Birmingham, which besides the parish of Birmingham includes part of the union of Aston, the epidemic of smallpox during the present year (1874) has caused 639 deaths, or very nearly a third of the total smallpox mortality of England for that year—but yet a mortality, proportionately to population, very much below that of many of the large towns of England in 1871 and 1872. Of these 639 deaths, only 138, or 21·5 per cent., were in children under five years of age.

on the one hand, and the continental towns on the other, stands thus :—

Places and Periods compared.	Amounts of Population.	Actual Smallpox Deaths under five years of age during whole period of the epidemic in each town or group of towns.	Smallpox Deaths under five years of age during whole period of the epidemic for equivalent population of 1,000,000 at all ages.
Chief towns of Scotland (1871-4) - -	1,083,750	**750**	**692**
London (1870–2) -	3,254,260	**3,842**	**1,180**
Seventeen Unions of England most nearly corresponding to the 17 chief towns (1871–4)	2,446,353	**2,888**	**1,180**
Berlin (1871–2) - -	882,569	**2,837**	**3,448**
Hamburgh (1871–2) -	338,974	**1,938**	**5,717**
Leipzig (1871) - -	106,925	**659**	**6,200**
Chief towns of Holland (1870–2) - -	693,080	**4,474**	**6,455**

The difference exhibited between the towns of Scotland and those of England is due partly to the fact that at the time of the outbreak the whole population of Scotland under 5 years of age was, as already explained, within the provisions of the Scotch Compulsory Vaccination Act of 1863, while only a part of that of England was within the provisions of the English Act of 1867 ; and partly to the imperfect way in which in some of the English unions the Act of 1867 had been carried out. Hence, in particular unions, the deaths under 5 years of age not only greatly exceeded the general rate above stated for the chief places of England, but even in a very few amounted to or exceeded the rate shown for Berlin. Sunderland, it will be seen, is the only union of those comprised in the Table in which the deaths under 5 years of age from the epidemic were, as compared with the total population, more numerous than those in Berlin. But there were one or two populous unions not comprised in the Table in which they exceeded even those of Sunderland, as Dudley, where they were at the rate of 3,952 per million, and South Shields, where they were at the rate of 4,136. Even these high rates of mortality, however, fell far short of those observed at Hamburgh or Leipzic, or in the chief towns of Holland, taken in the aggregate ; much less at some of these towns, as at Rotterdam, where the rate amounted to 9,045, and at the Hague, where it amounted to 10,437.

The deaths in London under five years of age, *as compared with the population living under that age* (422,629 by the census of 1871), were for the two years and a quarter the epidemic lasted 909 per hundred thousand ; in the 17 large unions comprised in the table they were for the two years specified therein 790 per hundred thousand, and if the subsequent deaths to the end of the third quarter of 1874 be added, 875 per hundred thousand. There were five of these unions, and five only,

in which the death rate on this basis, for the full time the epidemic lasted in each, exceeded that of Dundee (1,140 per hundred thousand); viz., Liverpool (1,414), Norwich (1,437), Newcastle-on-Tyne (1,539), Sheffield (1,760), and Sunderland (2,609). None of them approached the rate exhibited by Berlin, much less that exhibited by Leipzig, the only continental towns for which I am able to make the comparison.

Mortality in England above five years of age.

Though the comparison between the towns of England and Scotland is for the reasons already stated unfavourable to the former as regards the smallpox mortality of young children, it is not so as regards the deaths of persons who are older. And this is just what might have been anticipated from the fact that a compulsory vaccination law (though only one of moderate efficiency), was at work in England ten years before there was any such law in the other divisions of the United Kingdom. Taking the chief-town population of Scotland as estimated at the middle of 1872 at 1,094,061, and deducting the persons under five years of age, there remain 946,628 above that age, among whom there occurred in the $3\frac{1}{2}$ years 2,442 smallpox deaths, or at the rate of 2,580 per million. The smallpox deaths in London above five years of age were for the entire period the epidemic lasted 6,873, which on the population enumerated in 1871 above that age (2,831,631) gives a rate of 2,430 per million. In the 17 large extra-metropolitan unions most nearly corresponding to the chief towns, the smallpox deaths above five years were in the $3\frac{3}{4}$ years 4,543, which, on the population above that age enumerated in 1871 (2,116,320), gives a rate of 2,140 per million.

If I have not adverted to any influence which general sanitary conditions may have exercised on the smallpox mortality at home or abroad, it has been because the amount of any such influence is known to be wholly insignificant as compared with that of the presence or absence of effective vaccination in controlling smallpox mortality, especially in young children. What change of sanitary conditions, for instance, could have so reduced in a few years the proportionate smallpox deaths among young children, that in the chief towns of Scotland the deaths of children during the recent epidemic have been little more than a tenth of what they would have been according to the rate which prevailed before the compulsory vaccination law? The power of vaccination to save young children from fatal smallpox no matter what their sanitary conditions, and (with rare exceptions) notwithstanding extreme epidemic influence, is one of the best established facts in medical science. It was abundantly illustrated in medical practice in the recent as it has been in every preceding epidemic. And it is undoubtedly to the application of this great prophylactic measure to children at a sufficiently early age that the remarkable saving of life exhibited by the facts brought together in this section, is to be attributed.

Effect of compulsory vaccination in England on the general smallpox death rate,

The English Vaccination Act of 1853 had not been long in operation before its beneficial effects were demonstrated in a remarkable diminution of the general smallpox death rate of England, which soon began to compare favourably with the rates observed in those European States which were at that time regarded as relatively the best vaccinated. From the time when (in 1837) a national registration of the causes of deaths was commenced in England up to 1854 inclusive, the average annual smallpox death rate had been 405 per million of population, or more than double the average during those years of the death rate of Prussia—196 per million. But from 1855 onwards the difference began to diminish, till in 1859 the smallpox death rate of England fell below

as compared with that of Prussia,

that of Prussia, and so has continued in every subsequent year.* The average annual smallpox death rate of England from 1855 to 1870 inclusive was only 175 per million; that of Prussia during the same 16 years did not decline at all, nor did it even remain stationary at 196, but actually increased to 267: an increase which is extremely significant, and affords us a most valuable warning. For it was during those very years that an active propaganda against vaccination was at work in Prussia, and its influence not being counteracted by a compulsory law of direct and easy application (as already explained), the natural result occurred, and a remarkable falling off in the annual vaccinations took place.† It is not, therefore, in the least surprising to find that in the epidemic of 1871 the smallpox death rate of Prussia should have been so much higher than that of England.

The smallpox death rate of England up to 1854 (405 per million) was more than double the death rate of Sweden for the 45 years from 1810 to 1854 inclusive, (177 per million). But the average in England from 1855 to 1870 inclusive (175 per million) was not more than the previous general average of Sweden, and was in fact lower than the actual average of Sweden during those 16 years, such average having been raised for that period to an annual rate of 195 per million by a severe epidemic which occurred between 1865 and 1869. The earlier age at which, since 1853, vaccination has been performed in England than it is in

and with that of Sweden.

* Annual smallpox mortality per million of living population in Prussia and in England from 1855 to 1871 inclusive:

—	Prussia.	England.
Average of the seventeen years 1838–1854 -	196	405
1855 - - -	90	136
1856 - - -	70	121
1857 - - -	130	206
1858 - - -	260	335
1859 - - -	200	197
1860 - - -	190	140
1861 - - -	300	66
1862 - - -	210	81
1863 - - -	340	293
1864 - - -	460	373
1865 - - -	440	309
1866 - - -	620	144
1867 - - -	430	118
1868 - - -	180	96
1869 - - -	190	72
1870 - - -	170	118
Average of the sixteen years 1855–70 -	267	175
1871 - - -	2,430	1,024

† See table at p. 119 of Dr. Guttstadt's report. In the six years which preceded the outbreak of 1871 the annual infantile vaccinations of Berlin had averaged only 45 per cent. of the births. In the period from 1840 to 1854 they had averaged 70 per cent. In Leipzig, where there was no counteracting law at all, there had been, from the like causes a similar diminution in the vaccinations annually performed. (Wunderlich, Archiv der Heilkunde, 1872.)

Sweden has thus more than compensated for the length of time a compulsory law had been in operation in that kingdom in the effect produced on the general smallpox death rate of the two kingdoms. What will be the result of a comparison of them as affected by the recent epidemic cannot at present be stated, in consequence of the late period at which in Sweden the epidemic set in, and of its course there being as yet incomplete.*

§ 5.

Analysis of the mortality of the epidemic in England at different ages.

Of the 42,220 smallpox deaths which took place in England in 1871 and 1872, 5,817 (viz. 3,161 in 1871 and 2,656 in 1872) were in children under the age of one year. The proportion which this infantile smallpox mortality bears to the total smallpox mortality is somewhat less than 14 per cent., while previous to the Vaccination Act of 1867 the average annual proportion was, with scarcely any variation from year to year, 24 per cent. These 5,817 deaths include the cases (which constitute undoubtedly a large proportion of them) in which the disease was contracted before the children had attained the age when vaccination under penalty can be enforced —cases in which life might undoubtedly have been saved by timely vaccination, but to which it would be difficult to extend a compulsory law. The remainder, except of course those cases in which there had been lawful postponement of vaccination on account of the children's health, were the result of illegal postponement and neglect.

The deaths under 15 years of age were nearly all in the unvaccinated,

The deaths between the ages of one and five years were 7,711; between 5 and 10 years, 6,566; and between 10 and 15 years, 2,535, making an aggregate of 16,812 deaths between the ages of 1 and of 15 years. Of these all but a fraction might have been saved by efficient vaccination, and a very large proportion would undoubtedly have been saved if all the population up to 15 years of age, and not merely a very limited part of it, had been under the application of a vaccination law as effective as that which is now in force in England. Although in the vast majority of vaccinated persons the vaccination completely exhausts (usually for life and at all events for a great number of years) the susceptibility to variola, it is a knowledge which dates back to the earliest days of vaccination that there are some persons in whom that susceptibility is only partially exhausted and who may contract the smallpox within a few years, and even within a few months, or weeks, of having been vaccinated. Willan, writing in 1806, within eight years of the promulgation of vaccination, had himself already seen 30 such cases, and whenever the disease is extensively epidemic instances of this kind are not unfrequently met with. But the infection under these circumstances is usually so modified in its effects, the smallpox resulting is generally so mild and so void of danger to the individual attacked, that it is laid down as a rule by the leading medical authorities on this subject that in vaccinated persons under 15 years of age severe smallpox is rare, and deaths from that disease scarcely noticeable.† Under intensity of

* The long delay (up to two years of age) which the law of Sweden allows for the vaccination of children renders a large infantile smallpox mortality inevitable whenever that disease becomes epidemic; but, besides this, there has been, as I am informed by Dr. Berlin, the President and Director-General of the Medical College at Stockholm, considerable laxity, in that city at all events, in carrying out the law. As England, under its imperfect law of 1853, is shown above to compare not unfavourably with Sweden, a still more favourable comparison may be expected under the Acts of 1867 and 1871. The partial returns received from Sweden (see ante § 3) justify so far this anticipation.

† Entries, not unfrequently met with in the death registers at times when smallpox is epidemic, of death from "smallpox after vaccination" in young children are

epidemic influence, when a malignant and hæmorrhagic form of the disease prevails, it stands to reason that severe cases in vaccinated persons, whether children or adults, will be more common and deaths more numerous than at other periods, just as the mortality of the natural disease then increases (see § 2), and just as persons who may have already had smallpox are then more liable to take it, and to have it severely, a second time. Especially where the vaccination had been at all imperfect, the imperfect cases would be picked out in larger proportion than usual. Accordingly, in the recent epidemic, the severity and malignancy of which has been very largely in excess of anything within our previous experience, the deaths of children under 15 years of age bearing some marks of vaccination appear to have been more numerous than in previous epidemics. But still they were exceptional, and when the vaccine marks were satisfactory the mortality was very trifling. Among 420 smallpox patients under 15 years of age with proper vaccination marks (irrespective of the number of such marks, which at this early age seems to be of comparatively much less consequence), who were treated in the Stockwell Smallpox and Homerton Fever Hospitals, there were but two deaths, the total smallpox deaths in these hospitals under that age being 179. Of the remaining 177, 12 were in children who had been vaccinated but whose marks were of a manifestly imperfect character, and 165 in children who had not been vaccinated at all.* It does not, I think, admit of reasonable doubt that the 16,812 smallpox deaths arising from the epidemic in England between the ages of 1 and 15 years were, with comparatively small exception, the result of sheer neglect of vaccination.

but those above 15 years of age about equal among the vaccinated and unvaccinated,

The deaths in persons *above* 15 years of age which were registered in the two years were 19,591 ; of which 3,288 were between the age of 15 and 20 years and 16,303 had passed the age of 20. A very large proportion of these deaths, especially of those past 20 years of age,† were in persons who had been vaccinated. In the several hospitals of the Metropolitan Asylum District there occurred 1,358 deaths in persons above 20 years of age,‡ and of these 799, or about 60 per cent., were in persons who had been vaccinated and 559 in persons not vaccinated. These proportions, however, cannot safely be applied to the kingdom generally ; for in the hospitals of some of the provincial towns the preponderance (though not a large one) of fatal adult cases was in the unvaccinated, and there is besides good ground for believing (as will be immediately stated) that the proportion of adults who are vaccinated is considerably larger in the metropolis than in the provinces. Still I think it may without hesitation be accepted that of the fatal cases of smallpox above 15 years of age, half, or thereabouts, were in persons who had been vaccinated, or who had at least undergone something which had passed for vaccination.

---

almost invariably incorrect and misleading ; the cases in which the entry occurs being generally cases in which the vaccination had been performed while the patients were incubating the smallpox. Sometimes also cases are so entered in which an attempt at vaccination had been made, but without success.

* In the Poliklinik at Leipzic, of 117 cases of smallpox treated in vaccinated children under 15 years of age, none was fatal: of 266 cases treated in unvaccinated children under 15 years of age, 110 died (Thomas, Archiv de Heilkunde, 1872).

† Eighteen is, according to Mr. Marson, the age at which post-vaccinal smallpox begins to be chiefly noticeable.

‡ The deaths which occurred in these hospitals between 15 and 20 years of age cannot be given, as in the Table in the Report of the Asylum Boards Committee the cases, after the age of 10 years, are arranged in decennial periods of age only. Between 10 and 20 years of age the majority of deaths was in the unvaccinated.

the number of persons vaccinated being probably at least 50 to 60 times as many as the unvaccinated;

But if the *actual number* of smallpox deaths in persons above puberty who had been vaccinated were equal to, or even exceeded, that which occurred in persons who had not been vaccinated, it must be borne in mind that the proportion of our adult population which is protected against smallpox by vaccination is at least from 25 to 30 times as great, and much more probably from 50 to 60 times or more as great, as that which is unvaccinated. The *relative* number of persons who now-a-days attain manhood or womanhood without having been vaccinated is very small. Examination of the young men who are recruited for the Army has shown for many years past that, putting aside the small per centage who are marked with smallpox, the proportion of the remainder who do not present distinct marks of having undergone vaccination averages for the whole of England 3·9 per cent. of those examined, and for London separately 2·8 per cent.* As these small proportions include all doubtful cases, it is clear then that somewhat considerably more than 96 per cent. of those in England, or than 97 per cent. of those in London only, must have been vaccinated. Now recruits, I apprehend, are not generally drawn from that class of the population which has been the most cared for; and there is, therefore, a reasonable probability that the proportion of the whole adult population of England which is thus protected against smallpox is much larger. But even if the full proportion just given, or more than that proportion, be applied to the adult population generally — 4 per cent. being taken as unvaccinated, and 96 per cent. as vaccinated—it is clear that, with equal *actual* mortality among the two classes, the *relative* mortality of the former would be 24 times that of the latter. The figures then are conclusive that vaccination *as it was practised in this country* 15 *years ago and upwards*, instead of failing to protect persons from fatal smallpox after they had grown up, has in the immense majority of cases very effectually protected them. It would be a waste of time to insist on this any further. Much more important is it to consider how it is that it did not protect in the remainder, and that in two years (two years it is true of intense epidemic influence) an enormous number of adults, probably from 9,000 to 10,000, who in a rough and general sense must be taken as vaccinated, should have perished of smallpox in England.

showing the great protection which even in them vaccination had afforded.

Deaths so far as they occurred in the vaccinated were due mainly to imperfect vaccination.

Mr. Marson's observations.

The answer is not difficult—though it is not one which can be given with any satisfaction. The cases were, it may be affirmed with the utmost confidence, with comparatively few exceptions, cases in which the vaccination had not been thoroughly and efficiently performed. At the time this recent epidemic set in, rather more than 17 years had elapsed since Mr. Marson, in a memorable communication to the Royal Medical and Chirurgical Society of London, founded on his (even then unequalled) experience of smallpox at the London Smallpox Hospital, called attention to the fact that the fatal smallpox which during 16 years' observation he had met with in that Hospital, in persons in whom vaccination was said to have been performed, had been almost entirely in cases in which the vaccination had been imperfect, the vaccine marks being either wanting in essential characteristics, or deficient in number, or both. He demonstrated that, apart from any question of the

* Average of six years terminating in 1871. The Army Medical Report for 1872, which has appeared since this average was cast, shows that of all the recruits examined in England during that year, putting aside the few who had marks of smallpox, there were only 2½ per cent. (2·6) without marks of vaccination, and of those examined in London—upwards of 4,000 in number—only a little more than one per cent. (1·05). I have thought it right to make my assumptions in the text as unfavourable as possible to vaccination. I do not myself suppose that even one per cent. of the *general* adult population is unprotected.

different relative liability of well and ill vaccinated persons *to contract* smallpox, any vaccinated persons who *did* take it had it lightly or severely, with scarce any risk of death or with a risk not inconsiderable, according to the quality of the vaccination they had received. To the cases which he had at that time collected and analysed, and from which he drew these conclusions, he has since been able to add the result of 16 years' further experience (up to 1867) on patients who, though admitted to the hospital since the publication of his paper, had with very few exceptions been vaccinated prior to that time.* Taking the two series of observations together, an analysis of 1,161 smallpox deaths which had occurred in that Hospital in persons stated to have been vaccinated shows that in 614, or more than one-half of them, the vaccination had been little else than nominal, for in no fewer than 180 no mark whatever of successful vaccination could be discovered, and in 434 only a single mark of imperfect character. Of the remaining 547 deaths, 513 were in cases which, either in the character or in the number of vaccine marks which each presented, or in both these respects, fell considerably short of the standard of good vaccination, for in 384 the character of the vaccine marks was imperfect, and in 129 though the marks were characteristic they were only one or two in number. There had been in the Hospital but 34 deaths altogether in persons who had three or more proper vaccine marks, though 2,584 patients having such marks had been admitted; and in 18, or more than one half of these 34 deaths, the fatal result was not due to the smallpox merely (which in some of them was slight), but either to its being complicated with some other disease from which the patient was suffering, or to the patient having contracted some other disease, as erysipelas, &c., in the Hospital. Of the 2,584 patients to whom reference has just been made as having been admitted with three or more good vaccine marks, 1,505 only had the four or more such marks which constitute *the standard* of good vaccination, and among these 1,505, the fatal cases had been 13 only, in 10 of which there had been superadded disease. Summarily, the 32 years' observations show that, of 13,765 reputedly vaccinated patients admitted to the Hospital during that period the vaccination was very defective in 11,172, of whom 1,027 died; was reasonably good (as represented by three characteristic marks) in 1,079, of whom 21 died; and was quite up to the now acknowledged standard in 1,505, of whom only 13 died. These facts, while they are conclusive as to the necessity for vaccination, if it is to be a complete or nearly complete protection against fatal smallpox, being performed in the most thorough and careful way, illustrate also the extent to which imperfect and insufficient vaccination was practised at the period when the present adult vaccinated population, the recent smallpox mortality amongst whom is now under our consideration, would have received their vaccination.

Observations in the several London and provincial Hospitals.

The records of the various Hospitals in which smallpox was treated during the recent epidemic agree in showing, as has been already stated (§ 2), that the proportion of deaths to attacks among the vaccinated taken generally was, compared with those among the unvaccinated, very small; the proportion however in both classes being so influenced by the intensity and malignancy of the epidemic as to be considerably above the usual average. Unfortunately, most of these reports merely distinguish between the "vaccinated" and the "unvaccinated," and take no note of the quality of the vaccination. Wherever this was done Mr. Marson's observations were found substantially to hold good, nearly

* Evidence as given in Report of Select Committee on Vaccination Act (1867), p. 236.

all the fatal cases being amongst such as had been ill vaccinated or insufficiently vaccinated, and the deaths amongst persons thoroughly vaccinated being in comparison strikingly few. Some careful observations made in the Stockwell Smallpox and Homerton Fever Hospitals show that of 2,382 patients having marks of vaccination, 1,866 had characteristic marks (one or more), and 516 had marks which were bad or indifferent. Of the former 70 died, or 3·9 per cent.: of the latter 129, or 25 per cent. Of the 1,866 patients with characteristic vaccine marks, 1,306 had but one or two such marks, of whom 60, or 4·5 per cent., died; 560 had three or more such marks of whom only 10, or 1·8 per cent. died. According to the rate deducible from Mr. Marson's observations on patients with three or more good cicatrices of vaccination, the deaths among these 560 should not have been 10, but a little over 7; and probably the difference indicates what was due to exceptional epidemic influence. In the Leeds Hospital the deaths among the patients whose marks of vaccination were noted as imperfect were above 12 per cent., but among the patients with characteristic marks 2·75 per cent. only; there were 48 cases treated having three or more characteristic marks, but none of them was fatal In the City of Glasgow Fever Hospital the mortality of the smallpox cases among the vaccinated with bad marks was 21 per cent., but of those with characteristic marks only 3·8 per cent; very few cases were admitted, and none died, having more than two characteristic marks. By some of the hospital physicians severe observations are made as to the "badness" of the marks in many of the cases so classified, these being so imperfect and so wanting in the essential characters of the vaccine mark that they might have arisen just as well from some other cause, and at all events showed the vaccine effect to have been next to nil. In two of the Smallpox Hospitals of the Metropolitan Asylum Board, observations made in 4,523 cases, having some marks of vaccination, with reference to the *number* of marks only and without any regard to their *character*, (an omission greatly to be regretted), showed a mortality of 15·2 per cent. in the cases with only one mark, 11·7 per cent. in the cases with only two marks, 9·4 per cent. in the cases with three, and 6 per cent. in the cases with four or more marks. The death-rate in these Hospitals among the unvaccinated was 55·9 per cent. Of a total of 506 deaths occurring in the 4,523 patients with marks of vaccination, 373 were in 2,846 persons having only one or two such marks, 88 in 936 persons with three, and 45 in 741 persons with four or more. The proportion of cases to deaths, whether among the entire number of patients with three or more cicatrices (133 deaths out of 1,677 cases,) or whether among that portion only who had four or more marks (45 deaths out of 741 cases), is about three times as great as that shown by Mr. Marson's observations on patients treated by him in the London Smallpox Hospital who had the same number of marks respectively, the good and bad marks being taken together, and cases of superadded disease not being deducted. Making every allowance for increase in the rate of mortality due to the malignancy of the epidemic, the proportion observed in the two hospitals of the Metropolitan Asylum Board is suggestive of an unusual amount either of superadded disease, or of hospital influence, or of vaccination of a very imperfect character, or of all these causes taken together. A valuable report made by Mr. Dyke, the Medical Officer of Health of Merthyr Tydfil, on the epidemic as it affected the district of his local board in 1871–2, in which he gives the result of inquiries made as to vaccination in *every case* of smallpox, fatal or not, known to have occurred within the district, shows that among 308 fatal cases which occurred there were but 30 in persons having three or more marks of

vaccination, though 1,070 cases having this number of marks came under observation; and that of these 30 six only were among that portion of the cases (418 in number) which had four or more vaccine cicatrices. The death-rate among the patients with one cicatrix was 8·5 per cent.; of those with two cicatrices, 6 per cent.; of those with three, 3·7 per cent.; and of those with four, 1·5 per cent.; of 22 patients who had more than four marks none died. The death-rate among the unvaccinated was 51·1 per cent.

Whether, then, the smallpox deaths among the vaccinated adults in England, in the epidemic years 1871 and 1872 amounted to, or whether they exceeded, the 5,000 per annum at which I have ventured approximately to calculate them, this much appears to be very certain that, excepting a comparatively very small number of them, they were deaths which need not have occurred and would not have occurred had the vaccination been done, or had it taken effect, in the way and to the extent which experience has shown to be necessary for securing the *full* protective powers of vaccination. I say had it been done, *or had it taken effect*, for it must of course be allowed that there are cases in which, with the best performance of vaccination, the result may fall short of what was aimed at,—especially when, as must sometimes be the case, preserved lymph has to be used for vaccinating. But these are exceptions: and substantially the mortality was the mere outcome of the "carelessness and want of arrangements" with regard to vaccination, and the consequent "great deal of very inefficient, almost useless, vaccination performed in England," referred to by Marson in 1856 in his petition to the House of Commons;* and of "the appreciable amount of "utterly incompetent vaccination" and "very considerable amount of second-rate vaccination" stated by Mr. Simon in 1857 to be at that time current (along of course with a large amount of thoroughly good vaccination) in England and Wales.†

Causes of imperfect vaccination.

The specific defects in the practice of vaccination which have led to these results were pointed out at the time by these eminent authorities, and the extent to which they existed in England was shortly afterwards brought out with great precision and detail in an inquiry officially made (1860–4) under direction of the Lords of Her Majesty's Council by Medical Inspectors who visited every vaccination district in the kingdom. Summarily they were these: (1) a not inconsiderable amount of performance of vaccination by unprofessional and utterly incompetent persons; (2) a frequent want of special knowledge of vaccination on the part even of professional men, evidence of such knowledge not being a requirement of any of the licensing medical authorities; (3) a consequent disregard by such vaccinators, and even frequently a complete ignorance, of the rules laid down by Jenner as essential for the efficient performance of vaccination, and of the further rule emphatically laid down by the National Vaccine Board to be careful, in vaccinating, thoroughly to infect the system by the production of at least four vaccine vesicles‡—the disregard of the latter rule being in fact carried to such an extent

---

* Reprinted in "Papers relating to the History and Practice of Vaccination," page 25.

† See Letter addressed to the then President of the Board of Health prefixed to the other official "Papers relating to the History and Practice of Vaccination."

‡ The National Vaccine Board in their report for 1820 state that the principle of the practice they adopt and inculcate is "to affect the constitution of each individual very completely with the vaccine disease"; and, adverting to their directions to their own Vaccinators to make in each case four insertions of lymph, they add "from extensive experience and numerous reports, the Board have become most earnestly desirous that more, rather than fewer, vesicles should be produced."

that it was only by a minority of vaccinators that the rule had been observed : (4) a want of proper inspection by the vaccinators of the course and results of their operations. To these had to be added, as of enormous influence, the entire want of systematic arrangements for the proper performance even of public vaccination, so that instead of vaccination being done, as it ought always where practicable to be done, by direct transference of the vaccine lymph from arm to arm under conditions which should afford the vaccinator proper opportunity for selecting the lymph to be employed, it was extensively, and indeed most usually, done by employment of dry and otherwise preserved lymph with an inevitable large relative amount of failure.

The influence which Mr. Marson's important observations were calculated to bear on the practice of individual vaccinators—public or private —was very slow in manifesting itself. Although the Official Inquiry just referred to did not commence till nearly seven years after his paper had been communicated to the Royal Medical and Chirurgical Society, it was found that the great majority of vaccinators were still content with endeavours to produce sometimes one, more frequently two, and at the utmost three, vaccine vesicles. Practitioners who had vaccinated in this way all their lives, especially if in their own (very limited) experience they might not have chanced to see any fatal smallpox in persons whom they had so vaccinated, "couldn't see why" they should change their practice, nor "why" one vesicle shouldn't be as good as a dozen : and others who were willing to make a change had *their* troubles sometimes in the prejudices of parents, who, having been in the habit of seeing one or two insertions of lymph only made on children's arms, could not for their parts "see why" the doctor should be introducing new-fangled ways.

Steps which have been taken to remedy it in regard to public vaccination.

The Acts which were in force relative to Vaccination at the time Mr. Marson's observations were published did not provide for the special qualification even of public vaccinators, nor control in any way the practice, even by the public vaccinators, of vaccination. While the Vaccinators of the National Vaccine Establishment had, from the foundation of the Establishment, been bound to the observance of very precise instructions in the performance of their vaccinations, the public vaccinators appointed under the Vaccination Acts had been left to do them each as he liked. It was not until 1858, that, under the Public Health Act of that year, power was given to the Privy Council to make Regulations for securing the *special* qualification of public vaccinators, and the efficient performance of public vaccination. In 1859 Regulations for these purposes were issued, which embodied "Instructions" to be observed by public vaccinators in the performance of their vaccinations. And in the same year a memorandum of advice was drawn up by the Medical Officer of the Privy Council for the guidance of the authorities who were charged with the local administration of public vaccination, explaining the principles on which their arrangements for public vaccination should be framed, with a view to the maintenance of a proper lymph supply, and to the performance of the operation in the most effective way, within their respective jurisdictions. The Regulations which were issued, so far as they affected the qualification of public vaccinators, took full effect from the first ; but the alterations in practice which the Instructions required of the vaccinators were only made very gradually. By many, indeed, of those officers they were made at once cordially and with conviction ; by others, merely out of a spirit of deference, and sometimes with openly expressed doubts as to their necessity ; by very many they were not made at all. There were, as I have explained, prejudices to be got over.

The general result was that, though in a few years a very considerable improvement had been made, and was in progress, it was not at a pace which could be considered as satisfactory, nor such as the public safety required, and further measures for this purpose were therefore needed. In the equally important matter of arrangements for public vaccination, though certain minor changes had been effected, the radical alterations required were such as it was found could scarcely be carried fully out without such an amendment of the law as would bring them under the direct control of the central authority. These objects amongst others were sought to be accomplished by the "Vaccination Act, 1867."

Under that Act an entire reconstruction of the public vaccination arrangements of the kingdom, founded on the principles above stated, has been gradually going on and is now all but completely effected; skilled systematic supervision of the public vaccinators is provided for; and the fees to public vaccinators, which continue to be paid to them out of local funds on their own report of the success of their several operations, are supplemented by further payments out of monies voted by Parliament to those vaccinators, and to those vaccinators only, by whom the Reports of the Government Inspectors show that certain prescribed conditions, including of course a complete observance of the Regulations and Instructions in force for public vaccinators, have been fulfilled, and that the results attained in regard to the quality of vaccination have been altogether satisfactory. The improvement which has thus in a few years been effected in the character and completeness of the vaccination performed is, as shown by the Inspectors' reports, quite remarkable. So far as the public vaccination of the kingdom is concerned, there can, I think, be no doubt that it is now being performed, generally, under arrangements the most conducive to success, and with a careful observance of the instructions laid down; and that, as the result, the children so vaccinated are receiving a full measure of protection against smallpox, instead of the limited measure which used to be accorded them. A large number of children, however, it must be remembered, are annually vaccinated by private practitioners over whose proceedings there is no control.*

---

* It is disagreeable to speak, but I feel it a duty to do so, of the very imperfect way in which to my own knowledge private vaccination is not unfrequently done. Especially it has been brought to my notice on several occasions that, in certain districts in which medical competition of a low character is carried on, there are practitioners who bribe (as it were) parents not to attend the public vaccination stations by the offer to vaccinate the children imperfectly, *i.e.*, in one or two places only. In the report of the Leeds Smallpox Hospital for 1872 I find the following comments, in which I entirely agree: "It is much to be regretted that while Government takes care that vaccination "inspectors are appointed to every district, and the strictest supervision maintained "over public vaccinators, there is no inspection whatever of the children who are "vaccinated at private surgeries or at their own homes, the production of a formal "certificate being considered a sufficient guarantee that the operation has been "properly performed." Another very serious drawback to private vaccination is that it is so often done with preserved lymph (in tubes or on points), and that consequently it so often either partially or wholly fails. An illustration of this disadvantage is afforded in the Vaccination Officers' Returns for 1872, published in this volume. It will be seen, on reference to these Returns, that no fewer than 354 of the children born in the metropolis in that year were certified as legally "insusceptible of vaccination," in other words, as having been three times vaccinated unsuccessfully. Now I think I can undertake to say that there was scarcely an occurrence of this kind at any of the public vaccination stations in London in 1872, or any subsequent year; and I do not doubt that if any of these children were taken to a public station and there vaccinated they might obtain the protection against smallpox which unfortunately they are now without. *Real* insusceptibility to vaccination, it is well known, hardly exists.

It will be years to come before the persistent power of vaccination as practised within the last six or seven years to protect from smallpox, and especially from severe and fatal smallpox, will be tested, for it is seldom before puberty, and generally not till after 18 years of age, that serious post-vaccinal smallpox occurs. We are only in fact now approaching the period, when even the earliest measures which were taken for the improvement of the quality of vaccination in England can be tested on any portion of our adult population.

§ 6.

Re-vaccination.

The observations which were made during the recent epidemic afforded remarkable evidence of the value of re-vaccination, not merely in controlling the mortality from smallpox, but usually in preventing altogether the occurrence of the disease. Its power of preventing smallpox under circumstances the most favourable of all others for contracting it was tested on a very large scale on the nurses, servants, and attendants of the various Hospitals established for the treatment of the epidemic in the metropolis and in the provinces: the attendants in the Hospitals of the Metropolitan Asylum District alone amounting at one time to above 300. In every hospital report which has reached me it is specially stated that not a single one of these officials, who had been re-vaccinated before coming to take duty at the hospital, contracted smallpox. On the other hand, a few cases of the disease occurred in some nurses and servants in the Hospitals of the Metropolitan Asylum District whose re-vaccination in the pressure of the epidemic had been overlooked, and there was one case in a nurse who, having had smallpox previously, had consequently not been vaccinated on coming to the Hospital. There was also a very modified case in a nurse in whom re-vaccination had been performed, but not till after her arrival at the Hospital, and when the smallpox infection had already been received. The cases of smallpox which were admitted for treatment in the several Hospitals in persons who had been successfully re-vaccinated were very few and very slight. In the Hospitals of the Metropolitan Asylum Board, in which upwards of 14,800 cases of smallpox were treated, there were but four cases in which there was good evidence of re-vaccination having been performed with effect, and these were all light cases. In Liverpool, says Dr. Trench,* re-vaccination was found a constant and perfect protection against the smallpox. In the Newcastle-on-Tyne Smallpox Hospital, in which 778 cases were treated, there were two in which re-vaccination was alleged to have been successfully performed (but without mention whether there were marks of such re-vaccination or not), one of them 10 years and the other four years before the attack of smallpox: both recovered. In the same Hospital eight patients were admitted stated to have had smallpox before, five of whom were distinctly marked by it; one of the three not marked died, the remaining seven all recovered. In the Leeds Hospital there were four cases in which previous re-vaccination was alleged; but in none of them was the evidence of re-vaccination conclusive. One of them, in which the re-vaccination was said to have been done at seven years of age, was fatal; the other three cases were mild. There were three (fatal) cases of smallpox in persons believed to have had smallpox previously; but the evidence of the former smallpox is not stated. Similar infrequency and mildness of smallpox after re-vaccination was noted in the Hospitals abroad. In the Municipal Smallpox Hospital at Berlin, in which 1,529 cases were treated in persons who had been vaccinated, only 19 of these were in

* Annual Report of the Medical Officer of Health for Liverpool for 1871.

persons (all above 30 years old) who had been successfully re-vaccinated; they were all of them cases of varioloid or of variolous fever without eruption, and none of them died. In the same Hospital there were seven cases (three of them fatal) in persons who had previously had smallpox.* In the Baracken-Lazareth, used also as smallpox Hospitals in the same city, in which 1,805 cases were treated in persons who had been vaccinated, seven only were in persons who had been successfully re-vaccinated, of whom six had a mild attack, and one (a woman 60–70 years old) had the hæmorrhagic form and died.† In the Hospital at Leipzic, out of 1,504 vaccinated patients there were 13 who had been successfully re-vaccinated in early life, all of whom recovered: in the same Hospital there were 22 cases in persons who had had previous smallpox, and of these six died.‡ In the Hospital at Hamburgh the cases in persons who had been re-vaccinated were more numerous, amounting to 59 out of a total of 2,267 vaccinated patients; and there were three deaths.§

§ 7.

Resumé of the effects of the vaccination laws in saving of life from smallpox in United Kingdom.

The success, which has attended the Compulsory Vaccination Laws of the United Kingdom in reducing the smallpox mortality has certainly been very remarkable,—imperfect as the earliest law (for England) was, and short comparatively as is the time that, in either division of the Kingdom, and especially in England, laws of a more efficient character have been in operation. The smallpox deaths in young children (up to the age of five years), which previous to the system of compulsory vaccination constituted three quarters of all the smallpox mortality of the United Kingdom, constituted in 1871–2 less than a third of that mortality in England,‖ and not so much as a fourth of that in Scotland or in Ireland. In consequence of the saving of life thus effected among the young the present average annual smallpox death-rate of the United Kingdom, as compared with the average rate of the period of optional vaccination, exhibits a remarkable diminution.

The average smallpox death-rate of England for the 19 years from 1855 to 1873, inclusive, has, notwithstanding the extreme, and in our time unprecedented, malignancy of the epidemic we have recently gone through, amounted only to 250 per million of the population, as compared with 405 per million from 1838 to 1854 inclusive. In Ireland the diminution has been still more remarkable, the average death-rate for the ten years from 1864 to 1873 inclusive having been only 108 per million, as compared with an average of unknown amount, but which must at least have considerably exceeded 365 per million, from 1842 to 1860 inclusive. And though there are not yet the means for giving an average smallpox death-rate for Scotland since the introduction of compulsory vaccination which shall include the recent epidemic, sufficient is known to make it quite certain that that death-rate will be much below the previous average. In like manner, the smallpox death-rates of the several divisions of the United Kingdom, which before the enactment of Compulsory Vaccination Laws had been in most unfavourable contrast with those of some Continental States, such as Prussia and Sweden, in which a system (though an imperfect one) of compulsory

---

* Report by Dr. Lother Mayer, Deutsche Klinik, 1872, pp. 262 and 273.

† Report by Dr. Guttstadt, ibid, p. 357.

‡ Report by Dr. Wunderlich, Archiv der Heilkunde, 1872, p. 97.

§ Report by Dr. Oppert, Deutsche Klinik, 1872, p. 72.

‖ By the latest return—that for 1872—it constituted 30 per cent; but now (in 1874), the Act of 1871 having been two years longer in operation, there is every reason to believe that a further reduction will have taken place, and that the proportion will be about the same as in the other divisions of the United Kingdom.

vaccination had for a long time been in force, are found now to compare most favourably with them.

Severe test afforded by recent epidemic of smallpox.

An epidemic of smallpox so intense as that which recently prevailed, has afforded a very severe test of the value of our present vaccination laws: and when the mortality of that epidemic in Great Britain and Ireland is analysed and compared with its mortality in the other European States, for which the materials for such comparison have been supplied, it is impossible not to see that these laws have been the means of effecting an enormous saving of life among the young, and that such saving would have been much greater than it actually was, had they been sufficiently long in operation to bring within their scope all the children in the kingdom, (understanding by children all under puberty, say up to the age of 15 years,) and not merely a limited portion of them.

Opinion of the Vaccination Committee of the House of Commons.

The facts of that comparison, and indeed the whole facts of the epidemic when carefully studied, afford the most complete confirmation of the opinion which was expressed (in 1871) by the Select Committee of the House of Commons on Vaccination that "On the one hand, if vaccination "had not been general, this epidemic might have become a pestilence as "destructive as smallpox has often been where the population has been "unprotected; and that, on the other hand, if this prevention had been "universal, the epidemic could not have approached its present extent."

Natural smallpox is as destructive as ever;

The epidemic may have been useful in reminding some, although no one who had practical knowledge of smallpox could ever have doubted, that that disease, uncontrolled by vaccination, is at the present day exactly the same disfiguring and fatal disease which in the last century destroyed, on an average, 3,000 persons annually out of every million of our population, and which, at that rate, would now, but for vaccination, be causing in England alone an average annual mortality of nearly 70,000. There is good ground, indeed, for believing that the present annual death-rate from smallpox would have exceeded that of last century; for while the disease has lost nothing of its deadly character, the facilities of communicating it are infinitely greater now than they were formerly, on acconnt of the constantly increasing aggregation of population in towns and cities, and the enormously extended means of inter-communication between place and place.

and has the same tendency as ever to recur in epidemics.

The disease tends, just as ever, to recur in epidemics, and by and bye another epidemic will have to be faced, which may or may not have the character of ordinary epidemics of the disease, or may or may not be as virulent as that which has passed away, but against the fatality of which, however intense, we shall be able it is trusted to present much greater securities than were in existence at the time the recent outbreak took place, though not as yet all the securities we desire, or hope to attain.

Other epidemics are therefore to be expected.

Review of the securities against such outbreaks:

In view of this contingency, which may surely be looked for, I would venture, in concluding this report, to make one or two observations on our present position in reference to these securities in England.

(1) in regard to enforcement of vaccination of infants;

1. The first and most important of them is the vaccination of children in early infancy,—*pari passu* with the births. This is now, under the Vaccination Act, 1871, being accomplished in England to an extent to which it was never accomplished before; as years pass on, a larger and larger proportion of the young population is being brought under protection; and, by and bye, the whole of them (with some slight inevitable exception) will, we may fairly expect, be made safe against smallpox. The completeness of this result must, however, depend on the carefulness with which the systematic inquiries founded on the birth-registers into the vaccination of children, as directed by the Act, are maintained; and any neglect in this respect on the part of any local authorities or local officers is an injury to the whole com-

munity. For obviously the consequences of such neglect cannot be limited to the localities in which the neglect occurs. The returns made by the vaccination officers concerning the births in England in 1872, which are tabulated in Appendix No. 1 to the present Report of the Medical Officer of the Board, show that all of these births but 5 per cent. were at the date up to which the returns were made (January 31st 1874) accounted for on the vaccination registers: a result which, under the circumstances explained in the memorandum attached to the returns, must, it appears to me, be regarded as highly satisfactory, and which would have been still more complete than it is but for some large deficiencies existing in a comparatively few unions, due almost entirely either to insufficient appointment of officers by the local authorities, or to neglect or incapacity on the part of the officers appointed. Such deficiencies, when they occur, require of course, and receive, the vigilant attention of the Local Government Board. It must at the same time be borne in mind that however careful the working of the laws may be, the migratory habits of the lower classes of the population and other causes must always render it impossible but that some children should escape observation. It is doubtful, I think, whether even in a kingdom like Scotland this proportion can ever be much less than the 2·2 per cent. of the births which has been the average proportion for the last four years there; and in England, with its enormous town populations, a larger proportion must necessarily be looked for. Hence the great importance of that excellent provision in the present vaccination law of England which makes it the duty of each vaccination officer not merely to look after the vaccination of the children born within his district, but also of those who have migrated to it.

When these duties of foresight have been carefully executed, even for a few years, the dealing with importations of smallpox into any locality has been found to be a matter of comparative ease, consisting mainly in the exercise of great vigilance with regard to the surroundings of each imported case. Again and again during the recent epidemic did instances come to my knowledge where the smallpox was thus arrested or controlled; and one I will cite because it relates to a place—the city of Exeter—in which, before the Vaccination Act of 1867 came into operation, vaccination had been greatly neglected, and which had in consequence suffered very severely in previous epidemics of smallpox. On an official inquiry into the state of vaccination in that city, which I made in 1861, I found as many as 158 out of 844 children in attendance at the public schools unvaccinated. Exeter had a very fatal epidemic of smallpox in 1859, a slighter one in 1861, and again a very severe one in 1864 and 1865. When the Vaccination Act, 1867, came into effect steps were at once taken which have led to the complete vaccination of all children born subsequently in the city, and of as many as could be found of children who had been born in the city previously, or who have migrated into it. On the extension, in 1871, of the recent epidemic into the west of England, it soon found its way to Exeter. An incessant look-out for each imported case was kept by the vaccination officer, and in every such case, whatever measures in the way of vaccination or re-vaccination were required for the protection of the immediately surrounding population were at once taken. The result was that, though smallpox was imported many times into the city, and on certain occasions spread to a limited extent among adults and children born before the Act of 1867 who could not be got hold of in time, the total deaths caused by it were only one in 1871, eight in 1872, and 11 in 1873. Having an opportunity of inquiring with regard to nine of the 11 deaths of 1873, I found that the whole of these were either in

persons grown up or in children born before 1868, with the single exception of a child aged 2½ years not born in Exeter. Now, I believe that what was done here might be done under similar circumstances with the like results in every other place, and that in any and every locality where the current vaccinations are duly cared for, any outbreak of smallpox may be brought speedily and easily in like manner under control. But if the duties of foresight have been omitted, and if accumulations of unvaccinated children have been allowed to take place, any such dealing with an outbreak, at least in a crowded city, becomes almost impracticable.

(2) in regard to the manner in which vaccination has been performed

2. The second, and scarcely less important, security is the performance of the vaccination always in the most complete and effective way. It is beyond doubt that, for want of this having been done, some thousands of persons died of the recent epidemic who had believed themselves secure. And I fear that unless re-vaccination be adopted by our present adult population, and by our present adolescent population when they are grown up, to a much larger extent than has been done, there must in the next, and in succeeding epidemics of smallpox for some time to come, be a not inconsiderable amount of adult mortality. For (1) though, under the improvements which have been described as having been effected in the performance of public vaccination, the proportion of thoroughly vaccinated as compared with imperfectly vaccinated children must be year by year largely increasing, a long while must elapse before the result of this will be fully visible on the smallpox mortality, inasmuch as it is not, as a rule, till after puberty that smallpox mortality even in the imperfectly vaccinated is met with; and (2) it must be recollected that the manner of performing vaccination is only within the control of the government so far as *public* vaccination is concerned.

(3) in regard to re-vaccination.

3. The most perfect infantine vaccination is not an *absolute* eventual security against fatal smallpox, any more than the having passed through an attack of smallpox is an *absolute* security; but after proper infantine vaccination death from smallpox is very rare. Many persons, however, who have been properly vaccinated in infancy may at times of epidemic prevalence of smallpox contract the disease, and though they would have it generally in a very modified way, and with little or no risk of life to themselves, they would, from their liability to spread the infection, be of danger to the community, and so far even as themselves only are concerned would of course prefer not to have the disease at all. Hence, even to the best vaccinated, the additional security of re-vaccination at puberty is important, as giving all but complete safety from subsequent smallpox even of the mildest sort. But to all whose vaccination is other than the best (and it is certain that a considerable number of the present vaccinated adolescents and adults are in this position) re-vaccination is not merely important, but highly necessary. In every aspect of the case it would indeed greatly conduce to the security of the public against future smallpox epidemics if some means could be taken for giving effect to a rule which I ventured to lay down some years ago, and of the practical importance of which each year's experience has more and more convinced me, that "the re-vaccination of persons as they "reach about fifteen years of age should be as systematically done as "is the vaccination of young infants."

No. 6.

Abstract of Medical Inspections made in 1874 with regard to Matters of Local Sanitary Administration.

Area of Inquiry and Name of Inspector.	Ground of Inquiry.	Jurisdictions concerned.	Chief Facts reported by the Inspector.
1. Auckland Registration District. (Durham.) Pop. 69,159. Dr. Thorne.	Regis.-General's Return. Reports of Medical Officers of Health.	Auckland local board	*Auckland town.* High rate of mortality. Prevalence of preventable diseases. Portion of the water supply contaminated. Defective drainage. System of sewer ventilation faulty. Escape of sewer air into houses. Defective arrangements for removal of excrement and refuse. Insufficient house accommodation: consequent overcrowding. Pig nuisances.
"	"	Spennymoor local board.	*Spennymoor.* High rate of mortality. Prevalence of preventable diseases. Insufficient supply of water. Sewers unventilated. Cottages undrained. Total absence of privy accommodation in entire streets. No system for removal of excrement and house refuse. Excremental and other nuisances. Houses unfit for habitation. Overcrowding.
"	"	Auckland rural sanitary authority.	*West Auckland.* Extensive prevalence of enteric fever. Polluted water. System of sewerage and drainage very imperfect. Insufficient privy accommodation. Filth nuisances. Overcrowding. Increased sanitary action required.
"	"	"	*Auckland (other parts of rural sanitary district).* High rate of mortality. Prevalence of preventable diseases. Water supply in some parts insufficient and polluted. Overcrowding. System of sewerage and drainage very imperfect. Insufficient privy accommodation. Privy nuisances.
2. Axminster - - (Devon.) Pop. 2,861. Dr. Blaxall.	Memorial from inhabitants.	Axminster rural sanitary authority.	Sewers ill-constructed and insufficient. Nuisance from sewage catch pits, from privies and cesspools, pigsties, and accumulations of manure and offal. Insufficient privy accommodation. Water supply exposed to pollution. Unhealthy dwellings.
3. Baldock - - (Herts.) Pop. about 2,000. Dr. Thorne.	Report of Medical Officer of Health.	Local board - -	Outbreak of enteric fever. Polluted water. Air fouled by sewer emanations. Waterclosets without means of flushing. Accumulations of house refuse. Over-crowding. No provision for isolation and disinfection.
4. Barton-on-Irwell - (Lancashire.) Dr. Stevens.	Regis.-General's Return	Barton - upon - Irwell rural sanitary authority. Barton - upon - Irwell local board.	Prevalence of scarlet fever. Water supply deficient, and in part polluted. Sewerage defective. Scavenging neglected.
"	Regis.-General's Return	Swinton and Pendlebury local board.	*Swinton.* Epidemic of scarlet fever. Water supply insufficient. Drainage defective. Imperfect arrangements for scavenging.

Area of Inquiry and Name of Inspector.	Ground of Inquiry.	Jurisdictions concerned.	Chief Facts reported by the Inspector.
5. Bierley Lane - (Yorks.) Pop. 277. Dr. Thorne.	Local request - -	North Bierley local board.	Cases of enteric fever at a dairy. Evidence pointing to spread of the infection by means of milk supplied from the dairy. Drains infected, and sink pipes untrapped. Defective means of excrement disposal.
on Registration Sub-district. (Staff.) Pop. 24,188. Dr. Ballard.	Regis.-General's Return	Improvement commissioners.	High mortality from preventable diseases. Outskirts of district not all sewered. Drainage of private premises defective. Dirty and dilapidated privies. Polluted wells. Some houses insufficiently ventilated and unfit for habitation. Nuisances from manure and refuse heaps. Insufficient arrangements for scavenging. Footways in bad condition. Unwholesome slaughter-houses. Filthy bakehouses.
7. Birmingham and Aston. Pop. 343,787. Dr. Buchanan.	Regis.-General's Return	Birmingham town council. Aston rural sanitary authority. Aston Manor local board.	Large epidemic mortality from smallpox. Long continued prevalence of smallpox. No provision, except in a workhouse infirmary, for isolation of smallpox cases.
8. Bognor - - - (Sussex.) Pop. 2,811. Dr. Stevens.	Complaint from Merchant Taylors Company.	Local board - -	Defective sewers. Nuisances from ditch into which they discharge. Water supply inadequate. Inefficient scavenging. Nuisances from accumulations of manure, and from pigs. Overcrowding.
9. Bourton - on - the - water (Gloucester.) Pop. 1,109. Dr. Ballard.	Local information -	Stow - on - the - wold rural sanitary district.	Epidemic of enteric fever. Polluted water supply, defective drainage, and privy nuisances.
10. Bridgwater - - (Somerset.) Pop. 12,059. Dr. Blaxall.	Regis.-General's Return	Town council - -	Extensive and exceptionally fatal epidemic of measles. No means of isolation adopted. Spread of contagion through attendance of children at schools. Constant prevalence of enteric fever. Damp, ill-ventilated and ill-drained houses. Badly constructed water-closets. Defective sewerage. Imperfect system of scavenging. Water supply insufficient and much polluted.
11. Brixworth rural sanitary district. (Northamptonshire.) Pop. 13,856. Dr. Thorne.	Regis.-General's Return	Brixworth rural sanitary authority.	Enteric fever habitually prevalent. Water liable to surface and excremental pollution. System of sewerage and drainage in some parts very defective. Imperfect arrangements for disposal of excrement and refuse. Some houses unfit for habitation. Overcrowding. No proper appointment of Medical Officer of Health.
12. Bywell Registration Sub-District. (Northumberland.) Pop. 9,410. Dr. Airy.	Regis.-General's Return	Hexham rural sanitary authority.	Diphtheria prevalence at Blanchland, situated in a deep and damp valley, but with sanitary conditions generally good. At Prudhoe privies insufficient and ill kept. Scavenging neglected. Water supply insufficient. At Wylam want of privy accommodation. Water supply bad and insufficient.
13. Caius College - (Cambridge.) Pop. 112. Dr. Buchanan.	Local request - -	- - - - -	Prevalence of enteric fever among students resident within the College, and especially among those residing in Tree Court. Excremental matter appears to have gained entrance into the water-pipes in the court, and to have been delivered along with the drinking water.

Area of Inquiry and Name of Inspector.	Ground of Inquiry.	Jurisdictions concerned.	Chief Facts reported by the Inspector.
14. Calne - - - (Wilts.) Pop. 3,333. Dr. Blaxall.	Report from Medical Officer of Health.	Local board - -	Nuisances from extensive pig-slaughtering establishments in the town; from pigsties; and from accumulations of manure and refuse. Insufficient privy accommodation. Foul privies. Defective sewerage. Water supply contaminated by sewage and other filth.
15. Cannock - - (Staffordshire.) Pop. 14,010. Dr. Ballard.	Regis.-General's Return	Penkridge rural sanitary authority.	Prevalence of fever. Want of proper means of drainage, and of proper excrement removal. Unwholesome privies. Insufficient water supply. Polluted wells.
16. Carlisle - - (Cumberland.) Pop. 31,049. Mr. Power.	Report from General Inspector.	Town council - -	Extensive epidemic of typhus. Habitual prevalence of enteric fever. Houses huddled together and dirty. Overcrowding. Insufficient means for isolation of sick and for disinfection. Defective scavenging. Offensive middens. Much of the water supply liable to pollution.
17. Chesterfield Registration District. (Derby.) Pop. 77,406. Dr. Thorne.	Regis.-General's Return	Chesterfield town council.	*Chesterfield.* High rate of infantile mortality. Water supply derived from polluted sources. Rivers polluted by sewage and trade refuse. Sewers inadequately ventilated. Much nuisance from midden privies and foul accumulations of refuse. Privies built close to cottages. Houses unfit for habitation. Lodging-houses dilapidated, filthy, and overcrowded.
,,	,,	Dronfield local board	*Dronfield.* Constant prevalence of scarlet and enteric fever, and diarrhœa. Water supply insufficient and liable to pollution. Polluted watercourse. Offensive midden privies. Nuisance from accumulations of excremental and other refuse.
,,	,,	Newbold-cum-Dunston local board.	*Newbold-cum-Dunston.* Epidemic of measles, and prevalence of scarlatina. No system of sewerage. Offensive privies and middensteads. Overflowing cesspools. Unpaved streets. Improperly built cottages. Soil saturated with sewage. Lodging houses unregistered.
,,	,,	Whittington local board.	*Whittington.* Water supply partly derived from polluted wells. No proper system of sewerage. No systematic arrangements for removal of excrement and refuse. Nuisance from middens and piggeries. Overcrowded lodging-houses.
,,	,,	Chesterfield rural sanitary authority.	*Ashover.* Large infantile death rate. Prevalence of smallpox, scarlet fever, fever, and diarrhœa. Smallpox often epidemic. Scarlet fever endemic. Offensive drains.
,,	,,	,,	*Bolsover.* Prevalence of scarlatina; spread of which was facilitated by attendance at schools, and by want of means for isolation and disinfection. Polluted water and watercourse. No proper system of sewerage. No system of excrement and refuse removal.
,,	,,	,,	*Clay Cross.* Extensive prevalence of scarlet fever. Schools frequented by children from infected houses, themselves, in some cases, suffering from the disease. Defective drainage. Liquid filth and pigstye drainage in close proximity to dwellings. System of sewage disposal imperfect. Offensive middens.

Area of Inquiry and Name of Inspector.	Ground of Inquiry.	Jurisdictions concerned.	Chief Facts reported by the Inspector.
Chesterfield—*cont.* -	Regis.-General's Return	Chesterfield rural sanitary authority.	*Eckington.* Scarlet and enteric fever. Water supply polluted and insufficient in quantity. Watercourse polluted by sewage. No system of drainage. Excremental and other nuisances.
,,	,,	,,	*New Brampton.* No arrangements for removal of excrement and refuse. Consequent pollution of watercourses and soil. Escape of foul air into houses from cesspools. Ill-kept and undrained piggeries. Nuisances from heaps of refuse and open middens.
,,	,,	,,	*North Wingfield.* Scarlet fever prevalent. In some cases sick and healthy occupy the same beds. Drainage very imperfect. Wells sunk close to cesspits. Very offensive privies and other nuisances.
,,	,,	,,	*Pilsley.* No system of drainage. Pollution of stream. Foul wells. Offensive middens.
,,	,,	,,	*Shirland.* Scarlet fever prevalent. Nuisance from stagnant pool. No system of drainage. Water supply derived from wells liable to pollution.
,,	,,	,,	*Staveley.* Impure water. Polluted watercourses. Filthy cottages. Dilapidated and neglected midden privies. Imperfectly constructed surface drains.
,,	,,	,,	*Tupton.* No system of drainage. Filth nuisances. Scarlet fever prevalent. Sick and healthy associated and slept together. Schools attended by children from infected houses.
,,	,,	,,	*Walton.* Watercourse transformed into a common sewer, and made the receptacle for ashes and other refuse. Streets, yards, and courts much neglected. Offensive middens. Water supply derived from polluted source.
,,	,,	,,	*Wessington.* No system of drainage. Privies built close to cottages.
18. Chippenham (Wilts.) Pop. 22,432. Dr. Blaxall. -	Regis.-General's Return	Chippenham rural sanitary authority; Chippenham local board.	Enteric fever endemic. Fever mortality high, many unwholesome dwellings. Water supply inadequate and greatly exposed to pollution. Arrangements for the removal and disposal of excrement highly objectionable. Privy accommodation insufficient. Cesspits numerous and very offensive. Water-closets badly constructed. Sewers and drains leaky and inefficiently ventilated. Refuse heaps and pigsties unwholesomely near to dwellings.
19. Clayton, West (Yorks.) Pop. 1,531. Dr. Thorne. -	Local request - -	Local board - -	Outbreak of enteric fever. Disease spread by effluvia from infected sewer passing into houses. Water supply insufficient. Defective means of excrement disposal.
20. Dewsbury (Yorks.) Pop. 24,764. Dr. Stevens. - -	Memorial from inhabitants.	Town council - -	Houses dilapidated, ill-ventilated, and unfit for habitation. Cellar dwellings. Much nuisance from overflowing middens and from want of scavenging. Trade nuisances. Defective sewerage. Watercourse polluted. Water supply insufficient. Pig keeping nuisances.
21. Dudley (Worcester.) Pop. 43,791. Dr. Ballard. - -	Local complaint and unsatisfactory answers from town council as to recommendations made on previous inspection.	Town council -	With very little exception the sanitary conditions of the borough remain as when reported on by Dr. Thorne in 1871.

Area of Inquiry and Name of Inspector.	Ground of Inquiry.	Jurisdictions concerned.	Chief Facts reported by the Inspector.
22. Foleshill rural sanitary district. Pop. 17,250. Dr. Ballard.	Regis.-General's Return	Foleshill rural sanitary authority.	Prevalence of enteric fever and scarlatina. Drainage insufficient and very defective. Water supply exposed to pollution. Privy nuisances. Unhealthy cottages. Want of proper means of isolation and disinfection.
23. Godalming and Farncombe. (Surrey.) Pop. 6,862. Mr. Power.	Local complaint - -	Godalming Corporation; Guildford rural sanitary authority.	Constant prevalence of enteric fever. Wells frequently close to cesspools. Imperfect system of sewerage. Defective means of excrement and refuse disposal. Many old cottages in a dilapidated condition and unfit for habitation.
24. Hetton-le-Hole RegistrationSub-District. (Durham.) Pop. 13,004. Mr. Power.	Regis.-General's Return	Houghton-le-Spring rural sanitary authority.	Outbreak and spread of scarlatina in overcrowded cottages of miners. No privies or system of drainage. Sewerage incomplete. House accommodation insufficient; consequent overcrowding. Improperly constructed houses.
25. Lewes - - - (Sussex.) Pop. 10,753. Dr. Thorne.	Local request - -	Commissioners of borough of Lewes. Commissioners of the Cliffe, Lewes. Lewes rural sanitary authority.	Large epidemic of enteric fever, due in the first instance to pollution of the town water supply by water drawn from the Ouse, which receives the town sewage, and mainly spread by suction of polluting matter into the water pipes of an intermittent water service.
26. Over Darwen - (Lancashire.) Pop. 21,273. Dr. Stevens.	Local information as to prevalence of enteric fever.	Local board - -	General high rate of mortality. Large epidemic of enteric fever. Public water supply polluted by soakage from drain into which excreta from enteric fever patient had passed, and in various other ways. River extensively polluted. System of sewerage and arrangements for disposal of excrement and refuse extremely defective. Gross neglect of scavenging. Houses polluted by soakage from privies and cesspools. Unwholesome slaughterhouses.
27. Rowley Regis - (Staff.) Pop. 23,534. Dr. Ballard.	Regis.-General's Return	Local board - -	High general death rate, and high mortality from preventable diseases. General absence of proper means of drainage, and consequently abundant sewage nuisances. Unwholesome privies and great accumulations of excrement. Polluted wells and insufficient water supply. Unwholesome cottages.
28. Runcorn - - (Cheshire.) Pop. 12,443. Dr. Airy.	Regis.-General's Return; local complaint.	Improvement commissioners.	Prevalence of scarlatina and enteric fever. Want of means for isolation and disinfection. Arrangements for removal of excrement and refuse defective. Insufficient privy accommodation. Water supply insufficient, and in parts polluted. Trade nuisances.
29. Sedgley Registration Sub-district. (Staff.) Pop. 37,355. Dr. Ballard.	Regis.-General's Return	Upper Sedgley local board. Lower Sedgley local board.	High rate of mortality from preventable diseases. Severe outbreak of enteric fever at Lower Gornal. Absence of drainage. Foul privies and surface nuisances everywhere. Polluted wells. Unwholesome cottages.
30. Seisdon rural sanitary district. Pop. 16,430. Dr. Ballard.	Regis.-General's Return	Seisdon rural sanitary authority.	*Kinver.* High mortality from enteric fever. Defective drainage. Situation very low, and nearly level with river Stour, which runs close by the village, and the level of which is raised by a weir. Soil saturated with water. Damp and dilapidated cottages. Polluted water. Nuisances. Unwholesome cave dwellings.

Area of Inquiry and Name of Inspector.	Ground of Inquiry.	Jurisdictions concerned.	Chief Facts reported by the Inspector.
Seisdon—*cont.* - -	Regis.-General's Return	Seisdon rural sanitary authority.	*Pattingham.* Very defective drainage. Scavenging neglected. Accumulations of manure. Pigs improperly kept. Cottages damp, dirty, and unfit for habitation. Polluted water.
,,	,,	,,	*Swindon.* No proper drainage. Watercourse polluted by village sewage.
,,	,,	,,	*Tettenhall and Compton.* High rate of mortality from diphtheria. Drainage very defective. Cottages damp in consequence. Privies improperly kept. Wells liable to pollution.
,,	,,	,,	*Trysull.* Drainage very defective. Privy nuisances.
,,	,,	,,	*Upper Penn.* Many cottages dirty, damp, and dilapidated. Defective drainage. Polluted wells.
,,	,,	,,	*Wombourne.* Outbreak of scarlet fever, which spread through want of proper means of isolation. Nuisances from defective drainage. Filth and manure accumulations. Badly constructed and ill-kept privies. Water supply scarce and much polluted. Cottages damp, dirty, and ill-ventilated.
31. Stone - - (Staffordshire.) Pop. 10,088. Dr. Ballard.	Local complaint as to prevalence of fever and neglect on part of sanitary authority.	Stone rural sanitary authority.	Constant prevalence of enteric fever. No proper system of sewerage. Insufficient privy accommodation. Privy and excrement nuisances. Want of arrangements for scavenging. Watercourse polluted. Wells sunk close to cesspits and drain openings. Privies and wells specifically polluted by the excremental discharges of the sick.
32. Tipton Registration Sub-district. (Staff,) Pop. 29,445. Dr. Ballard.	Regis.-General's Return	Local Board - -	Constant prevalence of scarlet fever. High rate of mortality, especially among children. Imperfect system of sewerage. Defective arrangements for the removal of excrement and refuse. Insufficient scavenging. Courts and yards filthy and unpaved. Nuisances. Polluted wells. Dirty, damp, and dilapidated houses. Overcrowding.
33. Truro Registration district, (Cornwall,) Pop. 41,589. Dr. Blaxall.	Regis.-General's Return	Truro rural sanitary authority	Enteric fever endemic. General absence of proper means of excrement disposal. Water supply exposed to pollution. General want of proper sewage and drainage.
,,	,,	Truro Town Council -	Outbreak of enteric fever. Entrance of foul air from the sewers into dwellings. Water supply exposed to pollution. Sewerage defective. Houses damp and unwholesome. Insufficient privy accommodation. Trade nuisances; and nuisance from pigsties. Insufficient scavenging.
34. Ware - - - (Hertford.) Pop. 4,917. Dr. Thorne.	Regis.-General's Return	Local board - -	Real nature of fatal cases reported as due to fever somewhat doubtful. Authority ascertained to have recently provided a new system of sewerage and an improved water supply, and to have otherwise improved the sanitary condition of the town.
35. Wellingborough - (Northamptonshire.) Pop. 9,385. Dr. Thorne.	Regis.-General's Return	Local board - -	High general mortality, especially from fever, scarlatina, and diarrhœa. Polluted water supply. Defective sewerage. Sewers insufficiently ventilated. Water-closets imperfectly constructed, and not supplied with proper means of flushing.

Area of Inquiry and Name of Inspector.	Ground of Inquiry.	Jurisdictions concerned.	Chief Facts reported by the Inspector.
36. Willenhall Registration Sub-district. (Staff.) Pop. 27,144. Dr. Ballard.	Regis.-General's Return	Willenhall local board	*Willenhall.* No proper sewerage. Badly constructed privies. Polluted water. Private roads in bad condition. Flooded cellars. Accumulations of excrement and refuse. Defective arrangements for scavenging. Pig keeping and other nuisances. Dirty and ill-ventilated cottages. Slaughter-houses and bakehouses improperly kept.
,,	,,	Heath Town local board.	*Heath Town.* No proper drainage. Privies badly constructed and overfull. Sewage, pig-keeping, and other nuisances. Neglect of scavenging. Flooded cellars. Polluted water. Cottages, damp, dirty, and dilapidated. Overcrowding.
,,	,,	Short Heath local board.	*Short Heath.* High rate of mortality, especially from enteric fever and diarrhœa. No proper drainage. Badly constructed privies. Sewage and surface nuisances. Polluted water. Accumulation of excrement and refuse. Damp and dilapidated cottages.
,,	,,	Wednesfield local board.	*Wednesfield.* High rate of mortality from enteric fever and diarrhœa. No proper drainage. Accumulations of filth and sewage in channels and open ditches. Water scarce and polluted. Privies badly constructed, and productive of much nuisance. No arrangements for removal of excrement and refuse. Dirty, dilapidated cottages. Nuisance from manure works.
37. Wolverhampton - (Staff.) Pop. 68,291. Dr. Ballard.	Regis.-General's Return	Town council - -	System of sewerage incomplete. Defective arrangements for removal of excrement and refuse. More frequent scavenging required. New site for the deposition of refuse should be found. Privy nuisances. Water supply insufficient, and in some cases polluted. Dilapidated and ill-ventilated houses. Slaughter-houses and pig nuisances. Dirty bakehouses.

App. No. 7.

On Infectious Diseases in Birmingham and Aston, by Dr. Buchanan.

No. 7.

Dr. Buchanan's Report on Infectious Diseases in Birmingham and Aston, and on the Hospital Accommodation of those places.

The present inquiry has reference to the prevalence of infectious diseases, and particularly of small-pox, in the Registration Districts of Birmingham and Aston, and to the local provisions and proceedings for preventing the spread of infection, especially as regards the existing hospital accommodation in these districts.

The following Table, compiled from the Quarterly Returns of the Registrar-General, gives the chief data that have determined the inquiry :—

Deaths in each Quarter.	Birmingham. Population, 231,015.							
	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhœa.	Cholera.
1870—								
1st quarter - -	3	24	49	14	122	46	32	—
2nd „ - -	—	12	24	6	49	42	29	—
3rd „ - -	—	4	85	11	21	20	346	—
4th „ - -	—	35	98	17	49	57	38	—
1871—								
1st quarter - -	1	59	47	18	90	45	31	—
2nd „ - -	4	174	13	13	55	22	19	—
3rd „ - -	9	43	10	4	45	32	359	1
4th „ - -	30	13	25	15	36	40	82	—
1872—								
1st quarter - -	85	5	17	17	47	35	25	—
2nd „ - -	82	5	22	9	47	19	29	—
3rd „ - -	62	6	77	15	41	28	317	2
4th „ - -	37	17	150	13	55	43	66	1
1873—								
1st quarter - -	28	9	63	9	49	29	31	—
2nd „ - -	28	5	53	14	36	26	34	—
3rd „ - -	15	10	94	18	18	35	372	—
4th „ - -	35	67	158	35	16	47	70	—
1874—								
1st quarter - -	86	42	106	11	34	41	20	—
Summary.								
Year 1870 - -	3	75	256	48	241	195	445	0
„ 1871 - -	44	289	95	50	226	139	491	1
„ 1872 - -	266	34	266	54	190	125	437	3
„ 1873 - -	106	91	368	76	119	137	507	0

(*continued*)

Deaths in each Quarter.	Aston, whole District. Population, 146,818.							
	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhœa.	Cholera.
1870—								
1st quarter - -	—	4	18	10	31	14	6	—
2nd „ - -	—	3	23	9	12	14	11	—
3rd „ - -	—	8	28	5	7	22	200	—
4th „ - -	—	12	36	15	16	32	19	—
1871—								
1st quarter - -	—	18	16	14	33	21	8	—
2nd „ - -	—	97	11	12	29	15	11	—
3rd „ - -	2	31	9	5	30	7	201	—
4th „ - -	12	7	13	7	37	15	34	3
1872—								
1st quarter - -	20	—	6	5	45	8	8	—
2nd „ - -	19	5	16	12	22	13	7	—
3rd „ - -	17	—	55	14	7	32	210	2
4th „ - -	13	3	97	9	22	29	34	—
1873—								
1st quarter - -	2	3	68	9	26	15	7	—
2nd „ - -	13	3	34	2	12	13	19	—
3rd „ - -	6	3	80	12	7	29	205	1
4th „ - -	2	26	93	21	22	19	44	—
1874—								
1st quarter - -	55	45	61	18	39	21	13	—
Summary.								
Year 1870 - -	0	27	95	39	66	82	236	0
„ 1871 - -	14	153	49	38	129	58	254	3
„ 1872 - -	69	8	174	40	96	82	259	2
„ 1873 - -	23	35	275	44	67	76	275	1

The borough of Birmingham, municipal and parliamentary, had in 1871 a population of 343,787 persons, living on 8,400 acres, and distributed among three Unions or Registration Districts, as follows :—

	Population.
1. Birmingham Parish, a Poor Law and Registration District by itself - - - -	231,015
2. Aston, part of parish, forming a part of Aston Union	95,330
3. Edgbaston Parish, forming a part of King's Norton Union - - - - - -	17,442

For the borough, the Sanitary Authority is single, viz., the Town Council. The Poor Law Authorities, who are the Vaccination Authorities, are three, viz., for the several parts above, 1, the Guardians of Birmingham parish; 2, the Guardians of Aston Union; and, 3, the Guardians of the King's Norton Union.

In the part of the Aston Union outside the borough, and which, in 1871, had a population of 51,488, the Sanitary Authorities are two, viz., for Aston Manor (urban, population, 1871, 33,948), a Local Board; and for the remaining parts of the Union (rural, population, 1871, 17,540), a Sanitary Committee of the Aston Guardians. The Poor Law and Vaccination Authority, the Guardians of the Aston Union, act for both these parts, as well as for the parts of Aston within the borough.

No special consideration of King's Norton Union has appeared necessary; but Edgbaston, in this Union, being within the borough, is included in such general statements as are made respecting the borough as a sanitary area.

Epidemic Mortality in Birmingham Borough and in other Sanitary Areas.

The mortality from epidemics in Birmingham needs to be considered for longer periods than those shown in the foregoing table, and to be regarded by the light of the experience of other populations. As the borough is the chief sanitary area, I should have wished it to be also the area for this completer statistical investigation of epidemic prevalence. But with the means at my disposal, investigation of facts concerning the borough, as such, can only be made for the last 4¼ years. Here the average annual death-rate per 100,000 of the borough population from each epidemic disease is compared with the corresponding rates during the same period in an aggregate of 18 large town populations in England.

Annual Rates of Mortality, from January 1870 to March 28, 1874, per 100,000 living.	Small-pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhœa.
Birmingham borough - -	40	49	104	23	72	58	183
Aggregate of large towns -	71	49	83	8	68	65	133

For longer periods, statistical inquiry about the town of Birmingham has to be based upon the several registration districts that enter into the composition of the borough. Setting King's Norton district aside, the following table shows the broad facts concerning epidemic mortality in Birmingham and Aston districts for the last 20 years. Materials are here given for the comparison of more recent with less recent mortality from each epidemic disease, and for comparison of these districts with certain standards :—

Average annual proportion of deaths, at all ages, and under five years of age, from epidemic diseases in England and Wales, in the Metropolis, and in Birmingham and Aston Registration Districts, for the 10 years, 1851–60, and for the 10 years, 1861–70.

Districts or Groups of Districts.	Periods.	Deaths per 100,000 Living at the specified Ages.									
		At all Ages.					At less than Five Years of Age.				
		Small-pox.	Scarlet Fever.	Diphtheria.	Continued Fevers.	Diarrhœa, Dysentery, Cholera.	Small-pox.	Measles.	Scarlet Fever.	Whooping Cough.	Diarrhœa, Dysentery, Cholera.
Birmingham District (Parish).	1851–60	40	106	8	107	219	183	449	522	551	1,296
	1861–70	19	132	34	79	205	65	474	629	597	1,280
Aston District (Union).	1851–60	32	98	17	75	172	135	270	438	359	945
	1861–70	11	114	38	68	177	34	340	510	437	1,032
England and Wales -	1851–60	22	88	11	91	108	103	280	419	362	526
	1861–70	16	97	18	88	108	65	300	462	377	598
Metropolis - -	1851–60	28	94	8	85	152	130	389	488	656	708
	1861–70	29	114	18	89	129	116	418	581	653	751

Referring now to the present small-pox epidemic in Birmingham, the degree and fluctuations in its mortality in the borough have been as follows:—It began to be epidemic in the second quarter of 1871, and in that year it killed 61 persons. Increasing in 1872, it caused 298 deaths. In 1873 it was less, but still continuously prevalent, and caused 122 deaths. And in the first quarter of the present year it has been fatal to exactly the same number (122) of persons as in the whole of 1873. The increase of small-pox since the beginning of the present year deserves to be more precisely stated. In periods of four weeks, from January 3 to the time when this inquiry was begun, the deaths caused by this disease in the borough have been as follows:—To January 31, 25; to February 28, 41; to March 28, 45; to April 25, 58; and to May 23, 66. This last is the highest figure reached on the death record of any month since the epidemic began.

To these figures, again, must be added the deaths of borough paupers in the Aston Union Small-pox Hospital, amounting to 1 in 1871, to 7 in 1872, to 6 in 1873, and to 23 in the first five months of 1874.

For Birmingham borough, the Sanitary Inspector has kept a record of the non-fatal cases brought to his notice; and this number is found to bear an almost constant ratio ($6\frac{1}{2}$ to 1) to the number of deaths.

In the Urban Sanitary District of Aston Manor, 23 deaths from small-pox were registered in the district in 1872, besides 5 deaths in persons taken from the district to the Union Hospital; only 3 were registered in the district in 1873, and 1 in the hospital; and in the first four months of 1874, 19 deaths of residents in Aston Manor have been registered in the district, and 1 in the workhouse.

The Rural Sanitary District of Aston contains the small-pox hospital of the Union, and of the 51 persons dying there of small-pox between 1871 and May 31, 1872, only 7 had previously been residents in the rural parts of the Union. Besides these, however, several persons died at their homes in the district; and the largest mortality has been reached during the present year. In the first five months of this year, eleven residents in the district have died, 8 of them at their homes, and 3 in the Union Hospital.

Existing Hospital Accommodation for ordinary infectious disease.

The hospital accommodation which is needed for the purpose of staying the spread of infection through a community may exist with this for its primary object; or this object may be incidental to other primary ends which hospitals are intended to attain. Thus, charitable hospitals provided primarily in the interests of the sick may, in so far as they receive cases of infectious disease, and manage such cases with proper precautions, operate to prevent the spread of infection. Again, hospitals attached to workhouses, provided essentially for the relief of destitution, may also give to the out-door pauper class the means of isolation. But hospitals that, apart from private charity and apart from Poor Law relief, shall be provided essentially for preventing the spread of contagion among communities, are particularly within the province of Sanitary Authorities; and for the last eight years such authorities have had power to erect such hospitals, and to remove into them people who are sick of infectious disease, and are without proper lodging or accommodation.

For Birmingham and its neighbourhood, three charitable hospitals receive cases of infectious disease. The General Hospital makes 16

beds in two wards, essentially for scarlatina or diphtheria, or enteric fever; small-pox is here refused. The Queen's Hospital has a separate fever building, which in 1865 was used for small-pox, but has since been in use for ordinary medical and surgical cases. At present it makes only four special beds for infectious fevers, but it receives enteric fever into its ordinary wards. Mention will presently be made of an exceptional provision here made for small-pox in 1871–72. The Children's Hospital has one 12-bedded ward for scarlatina, and a small ward with three beds for diphtheria; and it receives a few enteric fever cases into its general wards. Here, again, small-pox is not admitted. The charitable hospitals together, then, have a total of some 30 or 40 beds for infectious cases. The last published reports of these institutions show that 89 cases of scarlatina, 17 of diphtheria, 62 of enteric fever, 42 of febricula, besides a few cases of other contagious disease, were treated in these 30 or 40 beds in the course of a year. The diseases here named are those which, along with small-pox, it is, in the interest of the public health, most important to isolate in hospitals. In one year, therefore, these hospitals gave assistance to the public sanitary service to the extent of isolating 210 cases of these infectious diseases.

Poor Law hospital provision, in ordinary times, is made as follows:—For the parish of Birmingham, there is at the workhouse at Winson's Green a detached building of four wards, with 10 beds in each. This accommodation serves for infectious diseases occurring in the workhouse, and to a small extent for those which occur among out-door paupers in the town. During the last six years, 35 cases of scarlatina, and 105 of enteric fever, have been treated here, making a total of 140, or an annual average of 23 infectious cases. As about one-third of these was among workhouse inmates, the advantage to the public sanitary service of the borough from this permanent provision is represented by the isolation of only some 16 cases a year. The special arrangements for the present epidemic of small-pox, temporarily made at Winson's Green, will presently be stated. For the parish of Aston, Poor Law hospital provision is made, for the parts of the Union outside as well as for the parts inside the borough, at the new workhouse at Gravelly Hill, where four wards, with 24 beds, were this year opened for infectious cases. These beds are for infectious disease occurring in the workhouse, and, to some extent, for such disease occurring among out-door paupers. The accommodation for the out-door poor, that which constitutes the incidental aid given to the sanitary needs of the public, is inconsiderable in amount. As for the King's Norton Union, it has not been thought necessary to make inquiry about the accommodation provided for sick paupers of Edgbaston parish, as in that part of the borough there are almost no paupers at all.

Besides the accommodation provided in these charitable and Poor Law hospitals—accommodation provided with no special reference to the sanitary needs of the public—there is no permanent hospital provision in Birmingham for treating in isolation persons who, in the interests of the public health, ought to be isolated when they are attacked by dangerous infectious disorders. No Sanitary Authority, neither the Town Council of the borough, nor the Local Board of Aston Manor, nor the Rural Sanitary Authority of Aston, has provided for the isolation of such persons.

Annual amount of infectious disease, and its proportion to existing Hospital provision.

Taking one year with another, it may be computed that, in the Sani-

tary District of the borough of Birmingham, there are about 800 deaths annually from the four diseases, small-pox, scarlatina, diphtheria, and enteric fever taken together ; and, on the reasonable estimate of 10 attacks to 1 death, these four diseases probably attack some 8,000 people in the average year. For Aston Manor, the yearly number of sufferers under these four diseases may be taken at about 800; and for Aston Rural Sanitary District, the yearly number is something above 300.

Of this number of dangerously infected sick persons, it is inevitable that a proportion must be so circumstanced that they cannot be treated in their own homes without communicating their infection to others, and thus promoting the spread of epidemics. Under the Sanitary Acts of 1866 and 1872, Local Sanitary Authorities have various functions of hindering the spread of infection. There can hardly be a more important function of this kind than the provision of hospitals : indeed, in regard of some infections, notably those of scarlatina and diphtheria, there are no means, at all to be compared with isolation in hospital, for preventing the spread of a limited number of cases into a formidable epidemic. Now for Birmingham borough and its neighbouring sanitary districts, the proportion of persons attacked by dangerous infection, who require, in the interest of others, to be treated in isolation at hospitals, may, perhaps, be variously estimated; but no one can contend that the insignificant provision against the spread of infection that is represented by the incidental action of charity and the poor law, bears any relation to the amount of provision that ought to be made to meet the requirements of the public health. It is my duty, indeed, to report that never in my interview with the Sanitary Authorities of Birmingham and Aston did I hear this position disputed. Difficulties in the way of giving effect to any proposal of at once providing permanent sanitary hospitals were raised, but the principle that such provision should be made by the Sanitary Authorities was admitted.

[None of the Sanitary Authorities have any chamber for disinfection by heat; but the Town Council of Birmingham (the other authorities do this less systematically) undertakes to see to the disinfection, by sulphur and carbolate of lime, of houses and articles therein that require disinfection.]

Special provision made against current Small-pox Epidemic.

In the second quarter of 1871, when small-pox caused 4 deaths, it may be considered to have begun its epidemic invasion. The Sanitary Inspector, who has considerable means of knowing the degree to which epidemic disease prevails in the town, reckons that at that time there were not more than 30 cases. Except for paupers at the workhouses, there were then no means for isolating such of these cases as were spreading infection, so that in the next quarter there were 11 deaths, and in the December quarter 45 deaths in the Borough. At the Birmingham workhouse were some old detached brick buildings that had been erected, some years before, in anticipation of cholera; and the use of these by the Guardians constituted the first extra provision that was made for the small-pox epidemic. Forty-four patients were admitted to the wards at the workhouse in the December quarter of 1871. In December 1871 the Town Council, as Sanitary Authority, joined with the Guardians of the parish as Relief Authority in providing, in proximity to the above-mentioned building on the workhouse grounds, two wooden wards for 22 patients, and speedily a second pair for 30 other patients was put up under the same arrangement. In February a third pair of wards,

similarly provided, was built on the same site, and gave accommodation to 20 more cases. Into the hospital as thus provided, 245 patients were admitted in the first quarter of 1872, and 320 in the second quarter, 217 in the third quarter, and 125 in the fourth quarter. Of the 907 admissions of the year, 846 had resided in Birmingham parish, and 61 in parts of the Borough outside the parish. It is important to note that, although no less than 592 out of the whole number of admissions, from December 7, 1871, to Febrary 8, 1873, were of patients sent paid for by the Town Council, yet of these there were very few, who might not have been received as paupers into any poor law hospital provided by Guardians; and thus the hospital at the workhouse practically served only the pauper class of the borough.

In February 1873 the arrangement between the Guardians and the Town Council came to an end; and thenceforth the use of the workhouse small-pox hospital was, ostensibly as well as in fact, confined to paupers, and its advantages were limited (or at least were intended to be limited), to paupers of the Borough residing within the parish. In 1873, partly through this limitation but essentially because of a lull in the epidemic throughout the Borough, the number of admissions decreased, being 77, 81, and 53, in the first three quarters of the year, respectively; and at one time during the month of October there were but 8 patients in the hospital.

Towards the end of 1873, when small-pox took on a fresh epidemic activity, the whole of the hospital provision that had been made at the workhouse was rapidly called into request; 106 cases were admitted in the fourth quarter of 1873; and 284 in the first quarter of the present year. In April, the weekly admissions having risen to 60, a fourth pair of wards, on the same piece of land, were provided by the Guardians of Birmingham parish for the accommodation of 30 patients.

The Town Council, as Sanitary Authority, has recently had under its serious consideration the provision of a small-pox hospital of its own. The Council went, indeed, so far as to purchase in May, for instant use and as a beginning of hospital provision to be afterwards extended, a large school house at Summer Hill. But an outcry was made against the site, and a memorial was signed by a large number of medical practitioners expressing "their strong conviction that a small-pox hospital should be removed as far as possible from human habitations." Thereupon the Council gave up their intention of using the building for small-pox, and at the time of my visit were considering how they could otherwise provide for small-pox patients.

For the Aston Union provision for paupers suffering under small-pox has been made at the old workhouse at Erdington. Early in 1871 this building was emptied of its ordinary sick, who have since been received into the new workhouse at Gravelly Hill, the old workhouse being left for infectious cases until the new infectious wards should be ready. It proved very serviceable when small-pox began to be epidemic. The accommodation which it affords for small-pox has been somewhat indefinite in amount, many rooms being available, but some rooms not being adapted to the treatment of the sick. Since August 1871 the admissions here were 12 in the last five months of that year; 76 in 1872; 49 in 1873; and, in the first five months of the present year, 152, as follows:—In January, 20; in February, 22; in March, 19; in April, 59; and in May, 32. Of the total 289 cases, 206 were received from parts of the Union within the Borough; 52 from the Urban Sanitary District of Aston Manor; and only 31 from parts of the Rural Sanitary District of Aston. In proportion to population these figures indicate a chief incidence of small-pox on the parts within the borough.

There has been some excess of incidence, too, on the parish of Erdington; and popular opinion has attributed this fact to the presence of the small-pox hospital there. So far as there has been some carelessness about the ambulance, this appears to be true; but in no other way can the prevalence of small-pox in the village be considered as related to the presence of the hospital there.

While these arrangements were being made by the Poor Law and Sanitary Authorities, the Committee of the Queen's Hospital, having at their disposal a detached house into which small-pox had occasionally before been received, admitted, in 1871, 21 cases of that disease; and in the first half of 1872, 33 other cases. The building then had to be pulled down, and, since July 1872, the charitable hospitals of Birmingham have not taken in cases of small-pox.

Comparative course of Epidemic here and in other Towns.

Another kind of action for the repression of small-pox has been taken by the Medical Officer of Health and the Sanitary Inspector of the Borough of Birmingham. By circulars to medical men, and by other means, combined with constant careful observation on their own part, these Officers of the Town Council have become aware of a large proportion, perhaps more than half, of the cases of small-pox occurring in the borough. In such cases the Inspector, with four special assistants, has disinfected houses, bedding, and clothing, in a systematic manner. Some similar action, but of a less systematic kind, has been taken by the sanitary authorities of Aston Manor and Aston Rural Sanitary District.

I would now call attention to some lessons that appear to be taught by a more detailed comparison of London with Birmingham in the matter of hospital provision against small-pox. So much of the following Table as relates to these two towns was prepared, when I found occasion to visit Coventry, and I have added the corresponding statistics of that town in the following Table :—

App. No. 7.

On Infectious Diseases in Birmingham a Aston, by Dr. Buchanan.

Small-Pox Deaths.

Year and Quarter.	In London of the Registrar-General. Population (1871), 3,251,804.		In Birmingham Borough. Population (1871), 343,787.		In Coventry Registration District. Population (1871), 40,113.	
	Actual Deaths.	Per 10,000 of Population.	Actual Deaths.	Per 10,000 of Population.	Actual Deaths.	Per 10,000 of Population.
1870—						
1st quarter	99	0·30	3	0·09	0	0·00
2nd „	118	0·36	0	0·00	0	0·00
3rd „	157	0·48	0	0·00	0	0·00
4th „	584	1·80	0	0·00	0	0·00
Whole year	958	2·94	3	0·09	0	0·00
1871—						
1st quarter	2,400	7·35	1	0·03	4 (1)	1·00
2nd „ *	3,241	9·94	4	0·12	14 (2)	3·49
3rd „	1,255	3·85	11	0·32	61 (3)	15·18
4th „	980	3·01	45	1·31	87 (4)	21·60
Whole year	7,876	24·15	61	1·78	166	41·27
1872—						
1st quarter	831	2·55	96†	2·80	‡ 48 (5)	11·90
2nd „	582	1·79	94	2·74	8 (6)	1·98
3rd „	237	0·73	65	1·89	1	0·25
4th „	131	0·40	43	1·25	0	0·00
Whole year	1,781	5·47	298	8·68	57	14·13
1873—						
1st quarter	46	0·14	29	0·85	0	0·00
2nd „	37	0·11	37	1·08	0	0·00
3rd „	15	0·05	18	0·52	0	0·00
4th „	17	0·05	38	1·10	0	0·00
Whole year	115	0·35	122	3·55	0	0·00
1874—						
1st quarter	24	0·07	122	3·55	0	0·00
April and May	3	0·01	132	3·85	(?)	(?)
	* In June 1871, the hospital accommodation reached its maximum; about 2,600 beds, or 8 beds per 10,000 of population. Used by all classes.		† In February 1872, the hospital accommodation reached its maximum (apart from additions recently made). This amounted to about 100 beds, or less than 3 beds per 10,000 of population. Used by paupers, almost exclusively.		‡ In January 1872, about 30 beds were provided; being 7½ beds per 10,000 of population. Used by all classes.	

Notes on Coventry from Registrar's Quarterly Returns.

(1) The four cases all occurred in one family: the father was strongly prejudiced against vaccination.
(2) Twelve of these occurred in Holy Trinity sub-district. "Not one of the 12 people who died had been vaccinated."
(3) No note.
(4) Of the 87 deaths, at least 31 were in unvaccinated persons.
(5) Of the 48 deaths, 28 occurred in January, 14 in February, and 6 in March.
(6) Of 6 fatal cases in Holy Trinity sub-district, 5 occurred in April and 1 early in May.

A very different progress of the small-pox epidemic at Birmingham, as compared with London and Coventry, is here seen. Small-pox was seriously epidemic in London for seven consecutive quarters of 1870–72, but, by the end of 1872, had diminished to very small proportions.

It was still more seriously epidemic in Coventry for six quarters of 1871–72, and then, in the middle of 1872, was almost suddenly and totally extinguished. But in Birmingham it was mildly epidemic for five consecutive quarters of 1871–72 ; was still prevalent, though less so, throughout 1873 ; and now, in 1874, when London and Coventry are free from the disease, Birmingham is suffering under a sharper visitation of it than at any former period since it first appeared in the borough. Thus, though the total loss by small-pox in Birmingham has, as yet, been considerably less than in the very serious epidemics of London and Coventry, it is apparent that, for Birmingham, a large remainder of the epidemic is still to come. It may even be surmised that, unless action in repression of the disease be more successful in the future than in the past, the greater part of the total mortality in Birmingham may be yet to come ; that the town is, in fact, in some such place in the course of its total epidemic as was occupied by London at the beginning of 1871, or by Coventry in the middle of that year.

It would plainly be most important, if it were possible, to determine with accuracy the reason of this sustained and increasing activity of small-pox in Birmingham. It may be believed that the more rapid extinction of the disease in London and Coventry may be connected with differences, as between them and Birmingham, in regard to vaccination ; and that, as neglect of vaccination may (as the Registrar's notes for Coventry show that it undoubtedly did in that place) have helped to the more rapid culmination of the disease, so the fear that was inspired by the great extension of small-pox in London and Coventry may have led to a more universal observance, for a time, of vaccination precautions, and thus the number of people susceptible to small-pox may have been more rapidly reduced in these towns than in Birmingham. Again, it may be believed that the epidemic has had a milder character at Birmingham; that slight attacks have been more frequent, so that less care has been taken to keep infected from healthy persons ; and that so the disease has been kept up from quarter to quarter without showing itself quite proportionately on the death returns. To whatever extent these considerations may be founded in fact, there is another aspect under which the difference between Birmingham and other towns must be regarded. Small-pox, as well as other infections, is capable of being wonderfully limited by isolation in hospital, and the amount of provision made for such isolation may be expected to affect materially the rate at which an epidemic of small-pox becomes extinguished. Without quoting as illustrations of this fact other instances where copious hospital provision for all classes has appeared rapidly to stop the spread of small-pox, comparison in this respect may be made between Birmingham, on the one hand, and London and Coventry on the other. In the latter towns, hospital accommodation for small-pox was provided at the rate of seven or eight beds per 10,000 of population, and all classes of the population made use of this accommodation. In Coventry two buildings were provided for small-pox. One of them, opened in January 1872, at the height of the epidemic, received nine patients in the first four days. During February it received patients at the rate of one in two days only. In the first nine days of March four other patients were admitted and that was all. This hospital was closed on March 30, though a few other cases were sent to the second hospital. Notes to the foregoing table will show that the disease was almost wholly extinguished before May. In Birmingham, during the whole three years 1871–73, the hospital accommodation never amounted to three beds per 10,000 of population ; and these beds, though open during 1872 to non-pauper patients, whom, for sanitary reasons, the

Town Council thought fit to remove, were not appreciably used by any but the pauper class.

It does not appear that there was any abstract objection on the part of other classes to removal to hospital; they went to hospital freely enough in London and Coventry. But apparently at Birmingham they did object to the notion of pauperism involved in removal to the Winson's Green Hospital on the workhouse grounds. This difference in the amount of hospital provision and in the classes that made use of it, must certainly be taken in account in estimating the reasons for the observed prolongation of the epidemic in Birmingham as compared with London, Coventry, and other places that might be mentioned.*

Vaccination Arrangements, ordinary and extraordinary, and influence of Vaccination on Small-Pox.

I do not propose to report on the ordinary vaccination arrangements of Birmingham and Aston Unions, as these are well known both to this Board and to the Local Vaccination Authorities. It is sufficient to say that, in the parish of Birmingham, public vaccination is now carried out on an excellent system; but that before the inauguration of this system in 1869 it was done in a very unsatisfactory fashion, so that the proper degree of protection against small-pox was not given. In Aston the arrangements are in a transitional and not yet quite satisfactory state.

Of small-pox patients admitted into the Birmingham workhouse 1,406 were from among that great majority of the population that had undergone some sort of vaccination, and 475 belonged to the small minority of persons who had never been vaccinated, or in whom the fact of vaccination was doubtful. The former had not, as a class, received the whole benefit that vaccination can give, but that they had received much protection is certain from the fact that only 7·1 per cent. of them died, while among the class of unvaccinated or doubtful 33·8 per cent. died.

Of exceptional action taken by the Vaccination Authorities to procure universal vaccination, and also re-vaccination after puberty, I have to report that during the whole period of the small-pox epidemic the guardians have, in addition to their ordinary arrangements, endeavoured, by placards and handbills, to induce people to apply for vaccination. In Birmingham Parish it has been thought well not to increase the number of attendances, regularly given on four days a week by Dr. Robinson at the several stations of the parish. At the workhouse of this parish in 1872 means were taken for promoting vaccination among inmates. In Aston union the ordinary attendances on one day in the week had this year, in the more populous districts, been supplemented so as to allow of vaccination being performed on any day. Moreover, the Sanitary Inspector assisted the endeavours of the Vaccination Officer of Birmingham Parish by giving him information as to streets where small-pox was prevalent; and, as a result of these measures, a larger number than usual of people in both unions had been vaccinated and re-vaccinated.

---

* One of the best differential experiences of the kind now in question is recorded by my colleague Dr. Blaxall. It is the case of an epidemic of small-pox in 1871, prolonged in Plymouth, but quickly extinguished in adjacent Devonport. The two places form almost one town, and no difference between the two except the different rapidity and copiousness of hospital provision could be detected.

Vaccination.—In view of the existing state of the epidemic, it appeared desirable to confer, in the first place, with the Vaccination Authoritities of Birmingham and Aston; and to consider with them what additional means might be adopted for obtaining more general vaccination and re-vaccination. I had the satisfaction of finding these authorities anxious to receive any practical suggestions on the subject; and I have to report that, as the result of our conference, a temporary increase has been made in the facilities habitually given for vaccination, and that active measures have been adopted for inducing people requiring vaccination or re-vaccination to apply for the operation. In the Parish of Birmingham Dr. Robinson at once undertook an extra attendance adapted especially to the convenience of working people, showing his usual readiness of resource in contriving the necessary arrangements for this attendance; and the Town Council co-operating with the Vaccination Authority, the advantage was gained of a room at the Town Hall being placed at Dr. Robinson's disposal for this purpose every Saturday afternoon. Some little modifications of arrangement, such as appeared requisite under the exceptional circumstances of the small-pox epidemic were adopted in Aston Union also. Fresh posters and handbills, urging to vaccination and re-vaccination, and announcing the new arrangements, were issued and distributed; and, with the view of urging on people individually the importance of obtaining without delay the utmost security against small-pox that vaccination can give, the Vaccination Committee of Birmingham have appointed four temporary assistant Vaccination Officers, and the Guardians of Aston Union a like number, to act under the instructions of the permanent Vaccination Officers. With the same object, too, they have requested employers of labour and others to make known, within the sphere of esch person's influence, the advantages that are offered by the authorities, and to urge a general acceptance of the benefits of re-vaccination. All this is in full operation at the time of my writing, and I am glad to report that much more vaccination, especially re-vaccination of adults, is being done at the usual stations at the usual times, and that the number of persons attending at the Town Hall extra station have numbered no less than 149, 250, and 229 on the first three Saturdays of June.

Temporary Hospital Provision.—I had afterwards the advantage of conferring with the three Sanitary Authorities on the subject of hospital provision, and placed before them in outline the statistics and observations contained in this Report. As before stated I found a general acceptance of the principle that hospitals, for the reception of cases of infectious disease, were a necessity to any complete system of disease prevention; and I have pleasure in recording my belief that hospitals for this purpose will, before long, be provided by the several Authorities. I pointed out, however, that hospital accommodation of a permanent kind to meet the customary wants of each sanitary area, was not of a nature to be provided in haste during the presence of an emergency; and I proposed to defer to this Report my observations respecting the amount and quality of permanent hospital provision. Meanwhile, I had strong grounds for representing to the Sanitary Authorities the need for their at once providing such hospital accommodation as would stay the spread of the present small-pox epidemic: I represented, namely, the enormous power to arrest an epidemic that hospitals, abundantly provided for the use of all classes, had appeared to have in other places; and the presumption that, in Birmingham

itself, some arresting influence had been exerted by the hospital provision made at the beginning of 1872 (see Table, page 7); a provision that had, however, failed to have full effect through insufficiency of its amount and through the restrictions attaching in practice to its use.

On these grounds, I urged the Town Council of Birmingham to persevere in their intention of immediately providing accommodation for the treatment in isolation of small-pox patients; of making this provision ample in amount; and of endeavouring to secure its being freely used by all classes. I urged also that too much attention should not be given to outcries made by people living near the site which the Council might choose; that a small-pox hospital, under proper discipline, would be a much safer neighbour than a house where a person lay ill of small-pox, and from which people were hourly passing backwards and forwards without hindrance; of which houses there were probably at that moment many hundreds scattered about the town. And I pointed out that, under existing circumstances, the policy of the Town Council would appear to be to take a vacant piece of ground of a few acres in extent—if, with a house, that could be used for kitchen and sleeping rooms, ready built on it, so much the better—and on that ground at once to build two temporary wards for 60 patients, adding more and more of such wards as the earlier ones threatened to become insufficient. To the Sanitary Authorities of Aston Manor and of Aston Rural District, I made similar proposals; and, as I believe, I left the several authorities in the mood to take the earliest and most efficient action in their power for overcoming difficulties, and for at once proceeding to make temporary hospitals for small-pox. I do not profess to regard as inconsiderable the difficulties, chiefly relating to questions of site, which the Sanitary Authorities, especially the Town Council of Birmingham, will have to surmount. But I must repeat that the fact of the epidemic being on the increase from month to month has thrown on these Authorities, and particularly on the Town Council of the Borough, where the increase is greatest, a correspondingly serious responsibility for setting aside or overcoming these difficulties, and for using immediately every means in their power to put an end to small-pox within their several sanitary jurisdictions.

Permanent Hospital Accommodation required for Infectious Diseases.

I have, then, left for discussion the arrangements which, in ordinary times, are necessary for preventing the spread of infection, particularly the amount and character of the permanent hospital accommodation which it is desirable to provide in order to prevent or limit epidemics of such disease. With regard to the provision of disinfecting chambers, mortuaries, and other means, in addition to the disinfecting arrangements at present used in and about houses, it is unnecessary that I should make any detailed observations, as such provision is obviously necessary as part of the standing precautions of each Sanitary Authority.

Respecting the nature of hospital provision to be made, I would refer for all general principles to the memorandum upon this subject issued by the Local Government Board. In applying these principles to Birmingham and Aston my present remarks will have reference essentially to the site, to the number of beds to be provided, and to the classification of the sick within the hospital. First, as regards site (and this applies equally to the sites of temporary and of permanent hospitals): the first condition is that it should be readily accessible to those who want accommodation in the hospital; and the opinion given by some

medical men in Birmingham—that an infectious hospital "should be removed as far as possible from human habitations"—can only be considered a figure of speech. To carry a person suffering under acute disease to any unnecessary distance from his home to hospital, is to excite in his friends objection to the transference, and wantonly to expose the patient himself to pain and danger. As regards the distance which, on medical grounds, it is right to secure between adjacent inhabited houses and an infectious hospital, I know of no evidence as to what proximity, if any, can be a danger to persons not actually under the same roof, but there is abundant evidence to show that very short distances suffice to prevent direct infection. I say "direct" infection, because such infection as may come from the use of infected cabs and ambulances, or from dealing with patients' infected clothing, is, as being merely a question of discipline and foresight, obviously not here in question. The site for the hospital should be such as would be the healthiest for a dwelling house; it should be where an abundant supply of good water can be assured to it; and where proper means of drainage and excrement disposal can readily be had. And the size of the site should be sufficient to allow of temporary wards being erected on it in case of need. As for the number and classification of beds to be provided, I would speak first of Birmingham Borough, and begin by recalling the facts that in ordinary times there is in the borough nothing but a little incidental provision for isolating infectious disease, and no such provision by the Sanitary Authority; that there are four infectious diseases—small-pox, scarlatina, diphtheria, and continued fever—which more particularly require to be treated in hospital, when they attack persons who cannot be properly isolated in their own houses; and that these four diseases, in average years, attack some 8,000 of the borough residents.

It is not easy to form a just estimate of the amount of permanent hospital provision that, in view of these and other circumstances, should be made in Birmingham. It may be argued that such provision needs to be but small, inasmuch as its very success in reducing the prevalence of epidemics must lead to a reduction of occasion for its use. But this consideration needs to be tempered by at least two considerations on the other side: the one, that very considerable reduction of infectious diseases, such as would materially lessen the need for hospital provision against them, cannot, under the circumstances of the borough, be very rapid; the other, that there will soon be a much more general use made of an infectious hospital than will at first be made. For it cannot be long before people in Birmingham comprehend the personal as well as the public advantages to be derived from the use of the sanitary hospitals. They will see that the saving of infection in their own families is a direct money saving, and that nursing in hospital sets free the labour of people who would otherwise have to spend their time in nursing at home. And the better quality of nursing and attendance to be had in hospital will be another advantage that will be increasingly appreciated. Even mothers will be induced for their children to accept more and more the benefits of hospital care. And thus the very advantages which the Sanitary Authority wishes people to accept as a means of preventing the spread of infection, they will more and more generally accept in their own personal interests. Accordingly, the proper amount of permanent provision now required to be made may, I think, be not unfairly estimated from the proportion of people who might now be expected to use the hospital.

Several experiences seem to suggest that at least one third of the number of persons, sick of the four infectious diseases named, would after very little teaching be glad to claim the advantages that a hospital

would give. A third part of the 8,000 annual sufferers from these infectious diseases in Birmingham gives 2,666 patients as those who may be expected to pass through the hospital in the average twelve-month at the present rate of prevalence of such diseases. About 10 cases a year may be reckoned to each bed in infectious hospitals ; so that 266 would be the number of beds to fulfil the average requirements of the borough on this method of reckoning them. This estimate, 266 beds, for the borough of Birmingham is notably below an estimate that has been adopted by some good authorities as being the amount of permanent hospital provision which it is in towns generally desirable to make against infectious diseases, viz., at the rate of one bed per 1,000 of population. Now, I should certainly not say that such an estimate was an unreasonably large one, especially when I observe that a number of beds approaching that standard have in certain towns been filled by patients with one epidemic disease only. But I am content that my suggestion of 266 beds should fall far short of the 350 that would be wanted in Birmingham to reach this standard. For I have remembered that at present the people there cannot be expected generally to appreciate the use of sanitary hospitals ; that scarlatina especially appears never to have been thought of by the people as a disease to which public sanitary precautions were applicable; and that typhus fever is habitually absent from Birmingham. Nor have I thought it needful to contemplate any permanent provision against cholera, nor any public provision against mere infantile complaints. On the whole, then, I think my estimate of 266 beds as the hospital accommodation wanted for the isolation of ordinary infectious disease may be taken as sufficient to enable the Town Council on many occasions to prevent the epidemic extension of such disease. Of course, I should not contend that it would be sufficient for all occasions ; or that diligence in detecting infectious disease at its commencement, with removal of early cases to hospital, disinfection and other sanitary precautions, would always succeed in keeping small-pox, scarlatina, diphtheria, and continued fever from exceeding the limits above estimated. There may be occasional failure in stopping infection ; diseases may become rapidly epidemic; and need may then arise for the extension of hospital provision beyond what is here proposed. But this more extended accommodation may be by temporary buildings.

Here, then, is a town that has difficulty in finding a central site for a hospital, and which requires on a fair estimate 266 beds in hospital. It is wished to satisfy reasonable fastidiousness as to neighbourhood, yet not to make sick persons travel from any part of the town over an unmerciful distance. Under these circumstances nothing can be more obvious than the convenience of dividing the necessary accommodation between two hospitals, and of placing one at each end of the borough. The two need not, of course, be of exactly the same size ; but it may be remarked that 130 or 140 beds is a very good number to arrange and manage in a single hospital. It is in this way, then, that the Town Council would, in my judgment, best provide the amount of infectious hospital accommodation required to cope with the common infectious diseases of the borough.

With respect to the classification of patients within a hospital of 130 or 140 beds certain principles must be held in view, and these may perhaps be most advantageously applied in Birmingham as follows :—Small-pox should not be received into the same building as other infectious fevers; and the provision for small-pox may properly consist of a pair of wards situated on one side of the administrative portion of the hospital, and connected with it merely by a roofed passage open at the

sides. Ground about these wards should be kept vacant, for an airing ground partly, but chiefly for the erection of further temporary wards for small-pox if occasion should unhappily arise. The experience of Birmingham itself has shown that 80 beds for small-pox would have been none too much to have had in readiness at the early times of the present epidemic; for, even at the first moment, when 30 cases only were known of, more than double that number had probably received the infection. Two wards, of 20 beds each, at each hospital would conveniently provide for these 80 beds. Other infectious fevers, scarlet fever, diphtheria, and continued fever should be accommodated in buildings, placed on the other side of the administrative block, and each of these diseases should be treated in a separate ward. For the average annual cases of scarlatina, 3,000 to 4,000 in number, I propose only another 80 beds, on the assumption that, as so many of these attacks are among children, less proportionate use would (at first at least) be made of the hospital for sufferers under this disease. These 80 beds again would be conveniently provided in two pairs of 20-bedded wards, one pair at each hospital. The scarlatina wards should be so placed as to allow of extension from them being made as demand for their use increased, as well as for temporary extension in times of epidemic. For continued fever, which in Birmingham is of comparatively fixed amount and is commonly enteric fever only, a third 80 beds similarly distributed would be a proper provision. Considering how easily, from sick rooms under slovenly management, this disease may spread, by means of sewers and drinking water, and how important it is that this danger should be obviated at its source, I suggest provision for the removal of rather more than a third of the number of those whem I reckon to be annual sufferers by the disease. The 20 or 30 beds that would remain afterwards for 240 patients suffering under small-pox, scarlet fever, and enteric fever had been provided for, should be in smaller wards, in which patients with diphtheria might be treated; where noisy patients, or patients attacked with erysipelas, might be put; where cases of other acute affections mistakenly sent in as fever might be kept apart, and for other purposes. In brief, the plan of each hospital would be: (1) An administrative block; on one side of it, (2) a pavilion and vacant ground for small-pox; on the other side of it, first (3) a fever pavilion, and next (4) a scarlatina pavilion, with vacant ground near it:—a pavilion signifying two wards, each of 20 beds (one for males, the other for females) with at least two adjacent smaller wards, offices, and also advantageously rooms for convalescents.

The arrangement here proposed would, of course, have a certain elasticity. Thus, if at a particular time there were no small-pox but much scarlatina in the borough, it might be right to use provisionally, and after due disinfection, the small-pox pavilions for the reception of the excess of scarlatina patients, instead of erecting temporary wards for scarlatina while the small-pox wards continued empty. At each hospital, besides the usual out-places, there should be a disinfecting chamber near to the laundry, and a shed for ambulances.

Permanent hospital provision for the Aston Manor Sanitary District should be on much the same plan as that proposed for the borough, of which this district is, in all but government, a part. 40 beds, 32 in two pairs of larger wards, and the remaining eight in smaller wards, would probably afford the amount and classification best suited to the wants of this district.

As for the Rural Sanitary District of Aston, it appeared, in conference with members of the Sanitary Committee of the Guardians, that hospital requirements, present and future, might, perhaps, be provided on a

somewhat different plan from that which appeared best for the town districts. A proposal to put up immediately an iron or wooden building for 32 patients, in order to contend against the existing epidemic, was about to be carried into effect; and it was thought that by arranging these beds in two buildings, to be situated one on each side of an administrative house, and each to contain a pair of eight-bedded wards, accommodation of the kind that would be wanted for ordinary sanitary purposes would be available after the present small-pox epidemic was over. This accommodation would not be permanent, but yet would be durable for some years; and before these buildings were worn out, a permanent hospital, or hospitals, would, it was contemplated, have been provided. The area of this sanitary district is large, and its population partly surburban, partly in villages, and partly rural; and the exact nature of the hospital provision to be ultimately afforded was felt to be a matter that might be advantageously considered in the light of the next few years' experience.

The success of these sanitary hospitals must depend, as has been before indicated, on the credit they gain with the public: notably, as to the excellence of their nursing and other arrangements for promoting the recovery of the sick. Their success will also depend on the co-operation of the medical profession; and in settling the medical attendance to be given at the hospitals, this consideration may properly find a place. The settling of this attendance, however, is a matter on which it would be well to be guided by the local leaders of the profession. The essential point to be insisted upon is efficiency of medical service, with the adoption of all means that can give public confidence in this efficiency.

No. 8.

Dr. Ballard's Report on the Sanitary Condition of Upper Sedgley Urban Sanitary District.

Dr. Ballard's Report on the Sanitary Condition of Upper Sedgley Urban Sanitary District.

The urban sanitary district of Upper Sedgley occupies the summit of the ridge of hills which runs through the registration sub-district, and the western slopes of those hills, as far as Pen Brook to the west, and a branch of the river Smestow to the south. The former brook separates it from the parish of Penn, and the latter from the parishes of Dudley, Kingswinford, and Himley. The district occupies about half the area of the entire registration sub-district, the acreage being estimated at about 3,600. The principal villages are those of Upper Sedgley, Upper Gornal (which includes Ruiton), Lower Gornal (which includes Barr's Meadow and Gornal Wood), Cotwell End, and Gospel End. The villages of Sedgley and Upper Gornal lie on the summit of the ridge, and on the high road between Wolverhampton and Dudley. The other villages lie on the hill sides, and all are favourably situated for effective drainage. The highest spot in the district is Sedgley Beacon, about half a mile to the north-east of the village of Sedgley. The elevation here is 777 feet above ordnance datum. The elevation of Gospel End toll-house is 666 feet, and the greater part of the village of Sedgley lies several feet higher than this spot. The elevation at Upper Gornal church is 699 feet; the elevation at Ruiton Street, Lower Gornal, is about 555 feet, and near the spring opposite 31, Summer Lane, Lower Gornal, 526 feet. Near the gasworks, not far from the lower end of this steep lane, the elevation is 379 feet. The geological character of the district varies in different parts. The village of Sedgley lies partly upon limestone (which is quarried in its neighbourhood), and partly upon a fissured sandstone, the upper layers of which are loose and slabby. Upper Gornal and Lower Gornal village also lie upon sandstone, which is loose and broken up to the depth, in some places, of about 30 feet, but which is quarried at lower depths. One such quarry is on the roadside at the northern end of Upper Gornal village. There are coal mines now being worked at Gornal Wood.

Site and locality.

Area.

Elevation.

Geological character.

At the census of 1871 the population was 14,455, of which 7,228 were males, and 7,227 females. The number of inhabited houses was 2,651. Hence the average number of persons to one house was 5·5 and the density of the population four persons to 1 acre, or thereabouts. The clerk informs me that the population was distributed between the several villages as follows:—

Population, &c

	Population.
Sedgley - - - - -	3,135
Upper Gornal - - - -	4,044
Lower Gornal - - - -	6,147
Gospel End - - - - -	368
Cotwell End - - - -	761
Total - - - -	14,455

The following Table compiled from data furnished to me from the rate book by the clerk, gives useful information as to the character of the dwelling-houses, and to some extent as to the social position of the inhabitants of the district:—

Total number of dwelling-houses rated (1874) -	2,979*
,, rateable annual value of them - -	15,967*l.*
Number of dwelling-houses assessed separately -	543
Total annual rateable value of them - -	7,246*l.*
Average ,, ,, per house - -	13*l.* 6*s.* 11*d.*
Number of compound assessments - -	511
,, houses assessed in compounds (6*l.* and under) - - - - -	2,436
Average number of houses in a compound -	4·8
Total annual rateable value of them - -	8,721*l.*
Average ,, ,, per house - -	3*l.* 11*s.* 7*d.*

The rateable value of all the property assessable to the general district rate is 28,584*l.* Hence, although the population consists mainly of labouring men and their families, the district cannot be regarded as one which will not bear such expenditure of money in public works as may be necessary to put it into a wholesome condition.

Industries.

The population are mainly engaged in coal mining, iron working, and nail making, which last occupation finds employment for women and children. A small part of the population is agricultural.

Results of Dr. Home's inspection in 1872.

In March 1872, when smallpox was epidemic in the district, Dr. Home made, under instructions from the Board, a report upon the arrangements of the Local Board for the reception of smallpox patients into a temporary hospital provided for the purpose at Lower Gornal. In the course of that report he pointed out that the sanitary arrangements of Lower Gornal were "in a grossly deficient and neglected state," that there was a great deficiency of water fit for drinking, that there was no proper provision for drainage, that the privies were inexpressibly foul, and that the houses were filthy and overcrowded. The final words of his report are these: "It would be difficult to find a "locality in which the sanitary conditions are worse, or one in which "apparently a more complete abnegation of duty in relation to them "has hitherto taken place on the part of the sanitary authority." On

orrespondence with Local Board.

April 5th, 1872, a communication, embodying Dr. Home's statement upon the general sanitary condition of Lower Gornal, was made to the Upper Sedgley Local Board, with a request that the Local Board would at once take steps to perform the duties imposed upon it by law. On May 16th, 1872, another letter was written to the Local Board urging upon it the importance of not delaying the provision of a proper water supply for the inhabitants, and inquiring what steps the Local Board proposed to take for improving the drainage of its district. To this letter the following reply was received, dated June 10th, 1872:—"In "reference to your letter of the 16th ultimo to the Upper Sedgley "Local Board, I have to inform you that the Board have appointed a "Committee to enter into correspondence with the waterworks com- "panies in the neighbourhood, and in other ways to ascertain the most "efficient manner of supplying the district with the requisite supply of "water. The large extent of the district will render it a very serious "and difficult undertaking, but the Board are willing and anxious to "take any step they can to remedy the deficiency at present complained "of. The question of the drainage of the district is one of still greater

---

* These houses are said to be thus distributed among the villages—

Sedgley - - - - - - -	667
Upper Gornal - - - - - -	774
Lower Gornal - - - - - -	1,295
Gospel End - - - - - -	88
Cotwell End - - - - - -	155

"difficulty, owing to the same cause; and the present very high rate "of local taxation in the district renders it quite impossible for them to "undertake such an expensive matter this year. They have, however, appointed a Committee to investigate the matter thoroughly, and "to report what measures it would be most advisable to adopt to "remedy the evils alluded to. The Board desire, however, to call the "attention of the Local Government Board to the death-rate of the "district during the last few years as showing that the state of the "district as regards the sewerage, although undoubtedly needing much "improvement, does not appear to be so injurious to the health of the "inhabitants as might be supposed from the inspector's report." This letter, being brief, I have quoted in its entirety, partly because recent events have shown that the continued neglect of the Board to supply proper means of drainage and a proper water supply has actually resulted in a serious and fatal calamity, and partly because it will appear in the course of my report that the difficulties feared by the Board have virtually no existence. Other communications arising out of the apparently high mortality from diseases, the spread of which is in great measure preventable by the due exercise of the powers invested in sanitary authorities, were subsequently made to the Local Board, and in April 1873, the clerk to the Local Board wrote to the Board as follows :—
"With regard to the water supply, I am instructed to state that the "Board are very desirous that the district pointed out by your Inspector should be properly supplied with water, and to that end have "been trying to get the waterworks company, who partially supply "the district, to convey water to that place. The company, however, "have been unable for some time to provide for their present customers, but as they are now engaged in erecting additional engines, "it is considered that they will be able on the completion of the "engines to furnish the full quantity of water needed.* The drainage "of the district is receiving consideration, but the Board have not yet "been able to determine the steps to be taken." No more satisfactory information was obtainable from the Local Board up to December 1873, when I was instructed to make an inspection of the district. The press of other official engagements prevented my undertaking this work before November 1874, and in the meantime a severe outbreak of enteric fever took place in Lower Gornal—that part of the district, the unwholesome and utterly neglected condition of which had been made a subject of special condemnation by Dr. Home. It would appear from my present report that positively nothing had been done to remove the unwholesome state of Lower Gornal, either in respect of its drainage, the condition of the privies, or of its water supply.

Having thus summarised the position of affairs up to the period of my inspection, I now proceed to describe the condition of the district as I observed it in the months of November and December, 1874.

Roadways.

Nearly all the roadways under the jurisdiction of the Local Board are in a wretchedly neglected condition, both in respect of repair and clean-

* The statements in this letter must refer to the proceedings of the Local Board at a period prior to Dr. Home's inspection, since the only correspondence between the Upper Sedgley Local Board and the South Staffordshire Waterworks Company upon the subject of the water supply of Lower Gornal took place in the years 1868, 1869, 1870. After this, as Mr. Haselden, the secretary of the Company, informs me, no application was made to the Company until October 1873. The answer to each application was the same in effect, viz., that the Company was willing to extend its mains and give the supply, on the provisions of section 35 of the Waterworks Clauses Act being carried out. Mr. Haselden informs me that no suggestion of a difficulty as regards engine-power was ever made by the Company.

App. No. 8.

Dr. Ballard's Report on the Sanitary Condition of Upper Sedgley Urban Sanitary District.

liness; and sewage and filth of all kinds lie and stagnate in the irregular and imperfect channels. The undedicated roadways, even in places which are populated, are in numerous instances scarcely passable for mud.

Sewering and drainage.

Sewering and Drainage.—The district throughout is unsewered, and the inhabitants of the villages are dependent for the removal of sewage and slops upon whatever natural facilities there may be for these matters to run off. Sometimes these natural facilities are aided by some imperfect brick or stone channelling, or by irregular channels scooped out in the earth. In any case the sewage either flows into the roadway and runs along the side of it to the lower parts of the district, or it stagnates in ditches or in some depressed portion of the surface of the ground where it can lodge. The result is that sewage nuisances of the most abominable and unwholesome character abound in all parts of the district even close to inhabited houses, and the slops and sewage soak into and pollute the wells. In some places, as, for instance, at Inhedge and Lower Gornal, there are some filthy and offensive open ditches which, being on an incline, serve to some extent as open sewers. Flooded cellars abound in Sedgley and Upper and Lower Gornal, and the water lodging in them was in some instances complained of to me as stinking. In respect of sewering and drainage the whole district has been utterly neglected by the Local Board, and not a single practical step has yet been taken to supply these wants of the district.

Privies and excrement removal.

Privies and Excrement Removal.—The privies of the cottages throughout the district are inexpressibly disgusting from accumulation of excrement, and from the fact that many of them are so constructed, or so dilapidated, that the excrement streams out of them on to the surface of the ground. Large numbers of them are dilapidated and leaky, and some without door, roof, or even seat, and deficient in every condition for privacy. In some instances the excrement leaking from the privies has unquestionably found its way into wells, and in other instances into houses and nail-shops, and even into the pantries where food is kept. In one instance, in Upper Sedgley, I found a great mass of excrement lying upon the floor of a privy which served for nine houses; and this state of things, although it had been seen both by the Inspector of Nuisances and a Sanitary Committee of the Board, had lasted for a fortnight without any effort to cause an abatement of the nuisance. In Bilston Street, Sedgley, there is a row of houses the common privy of which has to be emptied through the dwellings, and the inhabitants are compelled in turn to bear this nuisance under pain, it is said, of expulsion. Many houses are without privy accommodation of any kind.

Filth and surface nuisances.

Filth and Surface Nuisances abound, not only in public roadways, but also upon private premises. That excrement should be deposited hap-hazard is a natural result of the horrible condition of the privies which, in many instances, must be quite unusable.

Water supply.

South Staffordshire Waterworks.

Water Supply.—Part of the district is supplied with water by pipe and tap from the mains of the South Staffordshire Waterworks Company. But the extent of this supply is very limited. Mr. Haselden, the Secretary of the Company informs me that only 159 houses are thus supplied. These houses are all in Upper Gornal. He further informs me that "Sedgley village, part of Upper Gornal, Cotwell End, Moden "Hill, and Ruiton, are above the level of the Company's reservoir, and "cannot be supplied without additional plant, engines, &c.," but that "the Company is at all times ready to extend its works to supply places "within its district, provided the outlay can be shown to be fairly remu-"nerative." With respect to other parts, and these the major part of the district, the supply is derived from local wells and so-called "springs."

With respect to the local wells, many are very superficial, and very many either so obviously polluted with sewage and excremental matter reaching them from the surface or soaking into them from the soil as to be incapable of being used for any other purpose than "slopping," or so liable to similar pollution as to render the water dangerous, although it is still used for drinking purposes. I saw very few local wells in the district the water of which could be drunk without danger. In some parts of the district, as at Gornal Wood, there are no wells, and, under these circumstances, and in cases where existing well waters are too polluted for use, the inhabitants have recourse to the so-called springs, and, in some parts, have to carry water home from them, a distance of half-a-mile or more. In dry seasons, when these springs are low, women have been seen congregated about them all the night awaiting their turns; so deficient is the supply. With two, or perhaps three exceptions, these sources of supply are unfit for domestic use, either because they are manifestly and grossly polluted by matters flowing into them from the surface of the neighbouring ground, and by excremental matters accidently or maliciously deposited close to them, or carried to their brink on the feet of persons frequenting them from the villages, or because being uncared for and unprotected, they are liable to such pollutions.

Local wells and springs.

Pollution and deficiency in quantity.

The character of the water supply at Lower Gornal will be specially described hereafter.

Dwellings of the Poor and Labouring Classes.—Some of these cottages of the better class are clean enough, and, were it not for the sewage and privy nuisances about them, would be decent and wholesome dwellings. But many of the dwellings of the poor are unwholesome, not only from the defective conditions about them just referred to, but from the filthy condition of their interior, from want of due ventilation (some being built back to back), or from the state of dilapidation into which they have been permitted to fall—dilapidation which defies all efforts that might be made to keep the cottages clean and properly habitable. In addition to this, there is a considerable amount of overcrowding.

Dwellings of the poor.

The sanitary condition of Lower Gornal requires some special remarks, since it is here that the outbreak of enteric fever recently occurred, its spread being most distinctly traceable chiefly to the existing faults in drainage and water supply. I may premise that whatever I have said generally as to the want of proper drainage, excrement removal, the foul condition of privies, polluted wells, the unwholesome state of dwellings, and want of nuisance removal in the Upper Sedgley Local Board district, applies with full force to the part known as Lower Gornal. It was here that Dr. Home made those observations which occasioned the correspondence with the Local Board upon the drainage and water supply of its district. The village of Lower Gornal consists of one long street running along a declivity from Ruiton (near Upper Gornal) towards a place known as East Street and West Street. This main street is called Ruiton Street. Near the church, a street called Robert Street joins it from the direction of Upper Gornal, and opposite this, by the side of the church, is Summer Lane, a filthy, narrow, steep road, running towards Abbey Road and Gornal Wood, and having on the right or north side a considerable hamlet known as Barr's Meadow, through which what is known as the Straights Road (at a still lower level) can be reached. Much of the sewage from the houses in Ruiton Street flows into a ditch in the fields at the rear of that street towards Barr's Meadow; this ditch is not many yards distant from a spring, known as Caldwell Spring, which is unprotected from pollution, and to which

Sanitary condition of Lower Gornal.

App. No. 8.

Dr. Ballard's Report on the Sanitary Condition of Upper Sedgley Urban Sanitary District.

many of the inhabitants of this part have recourse for drinking water. But the spring does not appear to receive pollution from the sewage ditch. The sewage from the houses at Summer Lane runs down the lane at the side of the roadway as far as Abbey Street, at the bottom of the hill, obtaining there the addition of sewage from houses and pigsties and also of privy excrement. From this spot the sewage is conducted by a drain across the road to the hamlet of Barr's Meadow, where it forms an open sewer at the rear of a row of houses where it again receives leakage from privies and sewage from pigsties. After collecting in a large sewage swamp near the gasworks, and receiving additions from land springs, it flows off into, or rather forms a brook, "Bob's Brook," at the side of the Straights Road. In Summer Lane there are two so-called springs, which are little roadside stone cisterns, or dipping places. One of these cisterns receives its spring-water from the overflow of a well at the rear of a house in Summer Lane, in which one of the earliest cases of enteric fever occurred, and the well could scarcely have failed to receive excremental pollution from the privy of the house. The other and lower well also receives water from a spring on the opposite side of the road. But the most startling facts are, that while the lower cistern is actually situated in the sewage channel before mentioned as running down Summer Lane, and so receives a large admixture of sewage, the upper one is similarly polluted through the sewage from a broken drain-pipe within a foot of it. Inhabitants say that the water in this "spring" is sometimes actually discoloured when washing is going on up the hill. Yet these two springs are largely resorted to for drinking water by people from all parts of the village, from Barr's Meadow, and Gornal Wood; some people from Gornal Wood travel half a mile to fetch it for drinking purposes, so scarce is drinking water in this neighbourhood. There is another dipping place in the sewage channel at the beginning of Abbey Road, and both this and "Bob's Brook" in the Straights Road are used by publicans in the neighbourhood for brewing. I give this fact on the authority of several inhabitants, who spoke most positively upon the subject. The use of the brook water thus polluted is well known to the Local Board, not only because it is notorious, but because the Inspector of Nuisances has specially reported upon it to the Board.

Use of sewage water.

Mortality from all causes.

The following table shows for each year, from 1870 to 1874 inclusive, the estimated population of Upper Sedgley Local Board district, the number of deaths from all causes (exclusive of Dudley union workhouse), and the proportion of deaths to population (after making due allowance for the population of the workhouse) :—

Years.	Estimated Population.	Deaths from all Causes.	Ratio of Mortality per 1,000 of Population.
1870 - -	14,521	252	18·2
1871 - -	14,455	292	21·2
1872 - -	14,422	365 or, excluding smallpox, 315	26·5 of which 3·6 was smallpox.
1873 -	14,428	289	21·0
1874 - -	14,460	324	23·5

Mortality from zymotic diseases.

The following table, constructed from the death register of Sedgley, shows the number of cases of certain specified zymotic diseases which

have proved fatal in the Upper Sedgley Local Board district (exclusiv of the Dudley union workhouse), and in the several villages thereof during the five years 1870–1874 inclusive. I have arranged them in two groups, and added a column showing in respect of these diseases and of each group the proportion of deaths to population during the five years* :—

	Population, 1871.	Deaths from certain Zymotic Diseases. Group 1. Smallpox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping Cough.	Group 2. "Fever."	Diarrhœa and Cholera.	Totals. Group 1. Total.	Per 1,000 of Population.	Group 2. Total.	Per 1,000 of Population.	All these Diseases together. Total.	Per 1,000 of Population.
Sedgley Village—														
Gospel End Street†	480	3	2	4	—	4	1	8	13	27·0	9	18·7	22	45·7
High Street†	400	—	1	—	—	1	2	3	2	5·0	5	12·5	7	17·5
Castle Street†	330	1	—	—	—	—	1	3	1	3·0	4	12·1	5	15·1
Rest of Upper Sedgley	1,925	11	4	10	—	2	9	5	27	14·0	14	7·3	41	21·3
Totals	3,135	15	7	14	—	7	13	19	43	13·7	32	10·2	75	23·9
Upper Gornal—														
Ruiton	—	2	3	1	—	2	3	3	8	—	6	—	14	—
Inhedge	—	—	—	1	—	—	—	4	1	—	4	—	5	—
Pale Street	—	1	—	—	—	—	—	3	1	—	3	—	4	—
Rest of Upper Gornal	—	2	2	3	1	5	6	11	13	—	17	—	30	—
Totals	4,044	5	5	5	1	7	9	21	23	5·7	30	7·4	53	13·1
Lower Gornal—														
New Street, Gornal Wood†	320	1	1	—	—	—	3	3	2	6·2	6	18·7	8	24·9
Abbey Street†	100	3	1	—	—	—	3	2	4	40·2	5	50·0	9	90·0
Louise Street†	135	—	2	—	—	—	3	1	2	14·8	4	29·6	6	44·4
Askew Bridge Road†	66	—	—	—	—	—	2	1	—	—	3	45·5	3	45·5
Brook Street, Barr's Meadow†	295	2	1	2	—	1	4	3	6	20·3	7	23·7	13	44·0
Rest of Gornal Wood and Barr's Meadow	—	12	7	3	—	5	11	20	27	—	31	—	58	—
Himley Road†	490	5	1	—	—	3	3	2	9	18·4	5	10·2	14	28·6
Ruiton Street, Lower Gornal Village†	570	5	2	2	—	1	11	1	10	17·5	12	21·1	22	38·6
Summer Lane†	295	2	1	—	—	—	2	3	3	10·2	5	16·9	8	27·1
Rest of Lower Gornal	—	4	4	9	1	7	14	11	25	—	25	—	50	—
Totals	6,147	34	20	16	1	17	56	47	86	14·0	103	16·8	191	30·8
Cotwell End	761	2	2	3	—	3	1	5	10	13·1	6	7·9	16	21·0
Gospel End	368	—	—	3	—	—	1	1	3	8·2	2	5·4	5	13·6
Total of Upper Sedgley Local Board District	14,455	56	34	41	2	34	80	93	167	11·6	173	12·0	340	23·6

* The average annual death-rates may be obtained by dividing by four.

† The population of the streets is estimated approximately from the ascertained number of houses in them, at the rate of 5·5 persons to one house.

The following remarks are suggested by a consideration of the above table :—

(1.) The death-rate during the five years from the specified diseases in the entire district reached 23·6 per 1,000 of the population (1871), or nearly five per 1,000 per annum, which is vastly too high for an open country district like Upper Sedgley.

(2.) The villages in which these diseases were most fatal, and in which the death-rate from them exceeded the average of the whole district, were Sedgley village and Lower Gornal, the latter being much in excess of the former in this respect.

App. No 8.

Dr. Ballard's Report on the Sanitary Condition of Upper Sedgley Urban Sanitary District.

(3.) The diseases of group 1, which are diseases that spread mainly through direct or indirect personal communication between the sick and the healthy, were about equally fatal in Sedgley village, Lower Gornal, and Cotwell End, and in these villages their fatality was in excess of their fatality in the district at large.

(4.) The diseases of group 2, viz., "fever" (which appears to have been entirely entirely enteric) and diarrhœa, were fatal in excess of the whole district in the village of Lower Gornal alone. The mortality from them was, however, high in Sedgley village, while it was comparatively low in Upper Gornal and in the less densely-populated villages of Cotwell End and Gospel End. These are diseases the spread of which is mainly promoted by filth, bad drainage, and polluted water. It is impossible to avoid associating, as effect with cause, the small mortality from these diseases in Upper Gornal, as compared with the mortality from them in Sedgley and Lower Gornal (also large villages) with the fact that Upper Gornal is the only village supplied with Waterworks water and not entirely dependent for water upon local wells and springs. The high mortality from diseases registered as diarrhœa (some of which may have been really deaths from enteric fever registered under the name of the most prominent symptom) in Gospel End Street, Upper Sedgley, is worthy of special notice in connexion with the filthy condition of the back premises of the houses, and especially with serious pollution of the very superficial wells which supply the the inhabitants with water, due to soakage into them from the polluted soil and from neighbouring drains. Into one of them soapsuds thrown out from adjoining houses find ready access.

Mortality from enteric fever and diarrhœa.

During the four years 1870–73 there were registered in the several villages of the district the following numbers of deaths from "fever" and diarrhœa, viz.:—

	Population (1871).	Fever.	Diarrhœa.	Total.
Sedgley - - - -	3,135	13	17	30
Upper Gornal - - -	4,044	7	18	25
Lower Gornal - - -	6,147	17	35	52
Cotwell End - - -	761	1	2	3
Gospel End - - -	368	1	1	2

Taking into account the population of the three more important villages then, it would appear that the village which suffered most from fever up to the close of 1873 was the village of Sedgley, while in Lower Gornal fever was little more than half as fatal, and in Upper Gornal least fatal of all. In all three the mortality from diarrhœa was not very remarkably different. But in 1874, there were in Sedgley village no deaths from fever, and only two from diarrhœa; in Upper Gornal only two deaths from fever and three from diarrhœa; while in Lower Gornal there occurred 39 deaths from fever and 12 from diarrhœa. Probably some, at least, of these 12 deaths registered as from diarrhœa were actually deaths from the prevailing fever. The fever mortality in Lower Gornal for the year was, therefore, 6·3 per 1,000, and the mortality from fever and diarrhœa together 8·3 per 1,000.

Epidemic of enteric fever in Lower Gornal.

It is difficult to say exactly at what period the Lower Gornal epidemic commenced. However, it is certain that in September and October 1873 three deaths occurred from from enteric fever in Brook Street, Barr's Meadow, the sewage from which street finds its way ultimately into Bob's Brook in the Straights Road, the water of which is used for all

purposes but drinking by many of the inhabitants of Gornal Wood, and by publicans in Gornal Wood for making beer—perhaps for other purposes also. In January, 1874, a death occurred in a street known as Musk Lane, at the bottom of Brook Street, and in February, a death in Ruiton Street. Two deaths occurred in Gornal Wood in June, and one in July (a death in the same house having been registered as from diarrhœa in June). No death from fever occurred in August, but in September seven deaths occurred, in October 11 deaths, in November seven deaths, and in December nine deaths. In the course of the last four months of the year, 34 persons died from fever, and six from diarrhœa,—numbers which correspond to a mortality of 5.5 per 1,000 from fever alone, or of 6·5 per 1,000 from fever and diarrhœa together. The cases were under the care of three medical practitioners, who all agreed in stating the fatality of their cases as 1 in 20, and gave me, as nearly as they could, the numbers of cases they had attended. During the cold weather of November and December, the proportion of fatal to non-fatal cases of the disease is said to have been greater than previously. Judging from the imperfect data thus afforded me, I have estimated the number of cases of fever which happened in Lower Gornal between August and the end of the year at certainly not less than 700. Hence it would appear that during four months 114 per 1,000 of the population, at least, were attacked. In certain streets upon which the disease fell with great severity the proportion of individual attacks and of deaths was very much larger. Thus, in Ruiton Street, few houses escaped invasion, and 10 deaths and probably 200 cases occurred in a population of about 570 persons. In Summer Lane the first death occurred in September, but the disease had been prevailing there previous to that death. In this street, with a population of about 295 persons, two deaths and probably about 40 cases occurred. In one row of 21 houses, the occupants of which derived their drinking water from a well situated $4\frac{1}{2}$ yards from some filthy over-full privies into which the evacuations of the sick were thrown, and from which privies soakage into the well most assuredly took place, only one house escaped invasion by the fever. In Robert Street nearly every house had had fever in it at the time of my visit. In Abbey Street, Gornal Wood, the invasion was still more severe, and one of the medical men in the district informed me that, to his knowledge, nearly every house in Brook Street and New Street (Barr's Meadow) had been invaded. As I visited from house to house in the village of Lower Gornal, I found whole families had been ill with the fever, and sometimes I found as many as five persons in one house lying ill with it. Although it is probable that the disease spread in part through the medium of infected privies and in other less obvious ways, yet I fully ascertained that the principal agents in its spread were the waters of certain wells which—at all times more or less polluted with excremental matters and sewage matters soaking into them from privies and imperfect drains—had become specifically polluted by excremental matters containing the contagium of the fever. I have already alluded to the so-called "springs" in Summer Lane; and neither of them could possibly fail to have become specifically infected with the contagium from the cases of fever in that lane, and perhaps also from cases in other parts of Lower Gornal. And these springs are (as I stated in the former part of my report) largely resorted to for drinking water by the inhabitants of Gornal Wood and Barr's Meadow. I traced several cases in Gornal Wood to the use of this water.

Interview with Local Board; recommendations made, and their results.

So serious was the condition of affairs at Lower Gornal that, immediately I had ascertained the causes of the spread of the fever, I sought

an interview with the Local Board; and, under my advice, they passed (November 10) a series of resolutions empowering their Sanitary Committee :—

1. To obtain water for Lower Gornal from the South Staffordshire Waterworks Company by a temporary arrangement for that purpose, and to distribute it daily to the inhabitants by means of water-carts.

2. To notify to the inhabitants the dangerous quality of the local water they were drinking, and as soon as possible to obtain the closure of all polluted wells.

3. To set about a thorough cleansing of the place from filth; and to disinfect thoroughly all privies and the channels along which sewage anywhere flows; and to distribute appropriate disinfectants, with directions for their use, to families invaded by the fever.

In the absence of any hospital for the isolation of the sick, this is all I could expect to be done at once; and I received an assurance that my recommendations would be carried out.

To a certain, but very inadequate extent, some of these recommendations were carried out. On revisiting Lower Gornal on January 12th, I found that since November 19th water to the average extent of three pints per head per diem had been distributed by means of water-carts, yet that whole rows of infected houses had had none of the water; that such persons as took it had used, for washing purposes as well as for drinking, the small quantities of water given them; that by some of them it had only been obtainable occasionally, and that, in point of fact, the supply given had only served to supplement the supply from the wells and "springs" which were still generally resorted to for drinking-water. No steps had been taken to obtain the closure of polluted wells. It was further stated to me, on the authority of the Surveyor, that 700 loads of excrement and ashes had been removed by persons employed by the Board, but, so far as I could observe, little impression had thereby been made upon the foul and unwholesome condition of the privies in the district. Nevertheless I learned that, although the fatality of the fever had been very great during December, the number of fresh cases had lessened. Perhaps the severe frost which occurred during that month had something to do with the diminution of the number of cases, and with the higher fatality of the cases of the disease then in progress.

Sanitary administration.

Sanitary Administration.—The Local Board, which has sanitary jurisdiction in Upper Sedgley, was constituted by the adoption of the Local Government Act in 1867, and has thus been in operation for seven years. It consists of 20 members. The meetings take place monthly. From time to time a Sanitary Committee has been appointed, but until last October no executive powers were accorded to it; in October last, however, when fever was rampant in Lower Gornal, the Committee was "authorized to exercise and carry out all the powers and duties of the Board under the Nuisances Removal Acts."

A Medical Officer of Health, Mr. H. Ballenden, was first appointe din June 1872, at a salary of 10*l.* per annum and he continued in office until June 1874, when the period of his appointment lapsed. For several months, however, previous to this he had been incapacitated by illness. Notwithstanding that the Board was quite aware of the prevalence of fever in its district, no successor was appointed until October 27th (about a week before my visit), when Dr. Ballenden, a member of the Board, resigned, and was immediately elected Medical Officer of Health (not under Order) at a salary of 40*l.* per annum. His duties, like those of his predecessor, are defined by a resolution of the Board (July 8th, 1873) to be the same as those of a Medical Officer of Health appointed under Order, with the exception of his making reports

to the Local Government Board. Returns of deaths from all causes are made weekly to the Medical Officer of Health by the registrar of deaths, but no returns of cases of sickness are received from the guardians. The new Medical Officer of Health, however, being the Poor Law Medical Officer of the entire district, is aware of all such cases.

The offices of Surveyor, Inspector of Nuisances, and Collector of Rates, are united in one person, who receives for his services in these capacities a salary of 70*l.* per annum, and a commission of five per cent. on the money he collects. There is a complaint book for nuisances, but it has never been used; the inhabitants have never been informed of its existence, and any complaints made to the Inspector are trusted to his memory, and are not entered as such in any book. The Inspector of Nuisances is much hindered in his duties in that capacity by having also to act as collector; but he found time to make, in the report book which he keeps, 175 entries in the course of 1872, 275 in 1873, and 593 in 1874; but many of those are multiple entries, relating to one and the same nuisance. The nuisances entered relate chiefly to foul privies, offensive gutters, dirty houses, water in cellars, and unwholesome pig keeping. The columns in the book relating to the dates of service of notices, the orders of the Board, and the proceedings taken, with their results, are a blank. Nevertheless, up to the beginning of September last, nearly all the nuisances recorded are marked off as abated. The value of the inspection and of the records may be judged of by comparing this fact with the condition of the district as I have described it. No steps are ever taken to prevent the recurrence of nuisances, nor even have notices requiring abatement of nuisances within 24 or 48 hours (on account, I presume, of their serious nature) been enforced by the Board. It has not been the custom of the Inspector nor of the Board to make the systematic inspections ordered to be made by section 20 of the Sanitary Act, 1866, the reason alleged being, that the Inspector had been too much occupied with his other duties. Overcrowding is never dealt with.

Sanitary neglect of the Local Board.

It is well to state the fact plainly, for it it is notorious, that for some time past, party contention in the Local Board has run so high, and the time of the meetings has been so frittered away with squabbling upon matters of comparatively trivial importance, that, while all parties concur in admitting the frightful sanitary state of the district, nothing effectual has yet been attempted to improve it. For all practical purposes the Board is in a state of utter disorganisation.* The district rates are made from March to March, and, although so long ago as June last, the Board was aware that its funds were nearly exhausted, not even the estimates for the rates for the current year had (at the time of my visit, in November,) yet been agreed upon; and the board was in debt to its treasurer, upon the highway account, to the extent of 190*l.*

Scavenging.

The Local Board does not undertake the removal of excrement and ashes from private premises, and affords no facilities to private persons in this respect.† Inhabitants have been entirely dependent upon their

* Perhaps the word "demoralisation" would more correctly describe what the following fact illustrates. On October 27th, 1874, the Local Board adopted and acted upon a recommendation in a report made to it by the Sanitary Committee, to request the Local Government Board to *order* it to do things the necessity of which it perceived, and which it was perfectly competent to do without such order. I append to this report the report of the Sanitary Committee referred to, partly because it confirms all that I have stated in this report as to the sanitary state of the district, and partly because it shows that the Board itself is conscious of the outside influence which it permits to hamper its efficiency.

† A week prior to my visit, however, the Board engaged five men to assist the farmers in emptying privies and ashpits.

own efforts to obtain the removal of these matters by the farmers, who do not always want them, and will only take them to the extent of their needs, and when they please. The scavenging of the dedicated roads, however, has always been undertaken by the Board, which employs its own labourers for the purpose. But three months prior to my visit the Board had broken up its scavenging staff, for lack of money to pay the men, and little had been done to the roads during that time, and for a month nothing whatever. No proper shoot has been provided, and the filth wheeled from the road in barrows has been shot upon private premises anywhere that has been most convenient, with or without the permission of occupiers, who have sometimes (as the surveyor tells me) made complaint to him of this rough and ready treatment.

Dealing with infectious diseases.

At the time of the smallpox epidemic in 1872, the Local Board provided a temporary hospital at Lower Gornal, which was specially reported upon by Dr. Home, and the Board further appears to have done something in the way of disinfection and removal of nuisances; but, with these exceptions, nothing has at any time been done to prevent the spread of infectious diseases by putting into operation the sections of the Sanitary Act, 1866, enacted with this object.* At the present time there is no infectious disease hospital, and no mortuary; and all that the Board had done to check enteric fever up to the time of my visit was to engage a man to give away some sort of disinfectant, and to sprinkle sewage channels with some disinfecting powder.

Recommendations.

The following are the recommendations I have to make:—

1. It is desirable that the Sanitary Committee, already empowered by resolution of the Board to execute the Nuisances Removal Acts, should, with a view to efficient action and the avoidance of delays, meet at intervals not exceeding a fortnight.
2. It is desirable that the complaint book for nuisances should be used as well as kept. Public notice of the existence of such a book should be given to the inhabitants, and they should be requested and encouraged to enter in it their complaints of nuisances, and the Inspector of Nuisances should also be directed to enter in it all complaints of nuisances made to him. This book should be examined by the Sanitary Committee and the Board at each meeting, with a view to ascertaining what complaints have been made, and how they are being dealt with.
3. The Registrar of deaths should not only furnish full returns of deaths to the Medical Officer of Health at weekly intervals, but he should be requested to send him, in addition, immediate information of the registration of any death from an infectious disease in a new locality, and of any groups of deaths from such disease, or from diarrhœa, in any locality. On the receipt of such information, or on the occurrence of a case of infectious disease in his district becoming known to the Medical Officer of Health, he should at once visit the place, and see that the proper precautions to prevent the spread of the disease are taken. Especially he should take steps to secure the due isolation of the sick, or, if due and efficient isolation at home be impracticable, the removal of the case to an isolated hospital;

* The cost incurred in respect of the smallpox hospital was 275*l.*, and in respect of nuisance removal and disinfection, 61*l.*; but I am informed by the inspector that no thorough disinfections of infected houses and things were performed under the order of the Board. In the following year I find the sanitary expenses (entered as "disinfection expenses"), put down in the Board's accounts at 1*l.*

the proper and efficient disinfection of infected houses, rooms, and things, (following in these respects as strictly as possible the line of action laid down in the sections of the Sanitary Act, 1866, relating to these matters), and the removal of all conditions calculated to promote the extension of the disease; and, whenever it may be necessary to do so, he should request the clerk to summon a special meeting of the Sanitary Committee, with a view to its taking such steps as he cannot take independently of the sanitary authority.

4. It is highly desirable that the offices of Surveyor, Collector, and Inspector of Nuisances should be so far dissociated as that the Inspector of Nuisances should not be under the necessity of neglecting or performing imperfectly the duties of his important office. It is desirable that he should perform all the duties and keep such books as are directed to be performed or kept by Inspectors of Nuisances appointed under the order of the Local Government Board; especially he should not only attend to complaints and carry out any instructions he may receive from the Medical Officer of Health (under whose direction it is desirable he should act in all important matters), but also he should make systematic inspections of his district, such as are ordered to be made by section 20 of "Sanitary Act, 1866."

2. The Local Board or its Sanitary Committee should at once set earnestly about its long neglected work of putting into active operation the abundant powers it possesses, under the Nuisances Removal Acts, of dealing with the unwholesome conditions or nuisances which defile the district from one end to the other. It should not content itself merely with the service of notice for abatement of nuisances, but should follow up these notices, when not speedily complied with, by such active proceedings as shall prove to persons in fault that it really intends its notices to be obeyed; and under the powers of the 12th and 13th sections of the Nuisances Removal Act, 1855, it should take such proceedings as it is empowered to take not only for the abatement of nuisances, but also to prevent their recurrence.

6. The condition of the privies and the provision of proper privy accommodation, and for excrement removal, should receive the early attention of the Local Board. It should itself undertake the removal of excrement, making this work a charge upon its rate. By a special and well-directed effort it should at once clear away the enormous accumulations of excrement now existing in all parts of the district; and, having accomplished this task, it should arrange for the removal of excrement in the future so systematically that no excrement shall be retained near a dwelling for a longer period than one week. With the view of carrying out this object effectually, it is desirable that the Board should require privies to be so altered as that they should be able to contain no greater quantity of excrement than is likely to collect between one period of removal and another, and that such arrangements be made as shall prevent any danger to health or any production of nuisance during such interval. (The office report upon "Means of Preventing Excrement Nuisances in Town and Villages" is calculated to assist the Local Board in this matter, and may be consulted with advantage.)

7. Steps should at once be taken to provide the villages in the district with proper sewers placed at a sufficient depth to drain all cellars; and into the sewers so provided private premises should be required to be safely and effectually drained. All irregular modes of drainage should be prohibited, and all sewage should be so disposed of as that it may not become or create a nuisance. There are no difficulties from mining operations to interfere with the success of thi work, which should be carried out as speedily as possible under the direction of a competent engineer. The Local Board may be reminded that the providing of its district with sufficient sewers is a duty rendered imperative on it by statute, and that it is one which, on complaint of default being made to the Board, may be enforced under the 49th section of the Sanitary Act, 1866.

8. The provision of a supply of wholesome water for the inhabitants of its district where the existing supply is insufficient or unwholesome, is another statutory duty (similarly capable of enforcement) which it is most important that the Local Board should at once proceed to perform. In Lower Gornal and some other parts of its district, water which has not been shown to be other than wholesome, can be supplied by the South Staffordshire Waterworks Company, and where this is the case, the Local Board has statutory powers to compel owners of houses not supplied with wholesome water to take water from the Company. The Board should, therefore, either use this power, or give from the source indicated a gratuitous supply to the inhabitants by means of standpipes erected at convenient places, making the expense of the supply a charge upon its rate. In places which, on account of their elevation, the Company, on application made to it, admits itself unable to supply, the Local Board should make other arrangements, as, for instance, by storing in tanks or reservoirs the water of such springs as furnish wholesome water, or by sinking wells in situations and with precautions which may obviate any chance of pollution with matters dangerous to health. With respect to the polluted wells in Sedgley, Upper and Lower Gornal, and other places, the Board should deal with them under the powers recently given by the "Sanitary Law Amendment Act, 1874," section 50, so as to obtain their disuse. The polluted condition of the wells throughout the district as a subject to which the Medical Officer of Health should be instructed to give his earliest attention, with a view to the carrying of this recommendation speedily into effect.

9. The Local Board should vigorously carry into effect all the powers given it by the "Sanitary Act, 1866," for arresting the spread of infectious diseases, such as scarlet fever and enteric fever. It should not wait for these diseases becoming epidemic before putting the provisions of the Act into force, but it should deal with every case of such disease as if it were about to become the commencement of an epidemic. It should provide a permanent isolation-hospital, under section 37, and should cause to be removed thereto, under the 26th section, any person suffering from any dangerous infectious disease who is certified to be without proper lodging or accommodation, as (in a public health point of view) any person must be who cannot be lodged at home in such a manner as to secure other

persons in the house from danger of infection. The Local Board should further provide a proper carriage, under section 24, for the conveyance of sick persons to the hospital, and, under section 27, a proper mortuary, to which such dead bodies may be removed as are directed to be so removed by that section. It should further strive to prevent the spread of infectious diseases by careful and strict observance of the 22nd section, which provides for the due disinfection of disinfected houses, rooms, and things, and by vigilance and activity in enforcing sections 38 and 39.

I cannot conclude these recommendations without adding a hope that the Local Board will now see the advisability of sinking all differences of opinion upon minor matters, in a united endeavour from this time forth to perform all the duties laid upon it by the Sanitary Acts, and by the statutes under which, and for the purpose of executing which, it has been constituted.

APPENDIX.

Upper Sedgley Local Board.

Copy of the Report of the Sanitary Committee of the above Board, adopted by the Board, October 27th, 1874.

" The Sanitary Committee met at 10 o'clock on the mornings of Thursday, October 15th, Saturday, October 17th, Tuesday, October 20th, and Wednesday, October 21st. On Thursday and Saturday the whole of the houses, numbering 248, in Ruiton Street, Furlong Walk, the lower end of Holloway Street, Robert Street, Lake Street, Humphrey Street, and North Street were systematically visited. Of the 103 closets belonging to these 248 houses, 97 required immediate emptying ; many were overflowing and otherwise in a most disgusting state ; 31 were without doors, many without seats or roofs, and 48 required ashpits to be built ; several, together with pig-sties and wash cisterns, require to be removed further from the dwellings. The committee ordered 157 notices to be served, 154 on occupiers, and three on owners.

" On Tuesday the Committee revisited Ruiton Street, Furlong Walk, and the lower end of Holloway Street to learn the results of the notices, They found that only two nuisances had been removed, the one being upwards of 15 tons of manure from premises in the immediate neighbourhood of the New Connexion Chapel, and the other an accumulation of pig manure and other offensive matter. The Committee next inspected 58 houses at Red Hall. Of the 17 closets belonging to these houses, the whole required emptying ; seven were without doors, most required ashpits to be built, and some were dilapidated and filthy in the extreme. They ordered the usual notice to be served on occupiers. The Committee would here inform your Board that, of these 306 houses in these few streets, 207 are totally unprovided with water. Your Committee would also remind your Board that many or these plague spots had been visited by the former Committee, and in several instances the owners were waited upon so far back as the 5th October by one of its members, in company with your inspector, who urged upon them the duty of co-

App. No. 8.

Dr. Ballard's Report on the Sanitary Condition of Upper Sedgley Urban Sanitary District.

operating with the Committee by personally seeing to the removal of all the nuisances on their respective properties, and in every case the owners promised co-operation.

"On Wednesday your Committee, accompanied by four reporters of the local press, entered upon a systematic inspection of Sedgley proper, when 311 houses in Gospel End Street, Hall Street, Bull Ring, Bilston Street, Brick Street, Beacon Passage, and Tower Street were visited, when the same need of the services of the nightmen were revealed, together with the usual doorless and otherwise dilapidated closets, the same deficiency in number, and an almost equal lack of water; and where there is a supply your Committee feel sure it must generally be impure from the proximity of closets, pig-sties, &c., and the entire absence of drains and sewers; in fact, there is everything to invite fever. Your Committe ordered 212 notices to be served on occupiers as the result of this inspectien. Your inspector has since revisited the premises at Red Hall and in Sedgley proper, and reports that in only five instances has the notice received attention.

"Your Committee are fully alive to the naturally injurious results arising from the lack of a system of sewerage, and would be glad to receive instructions from your Board to inspect and report thereon.

"Your Committee have retained the services of Edward Brooks, who has been vigorously at work disinfecting, more especially in the fever districts.

"Your Committee have been most painstaking in seeking to elicit, both by conversation and observation, the cause of so general an accumulation of nightsoil and other offensive matter at this period of the year, and of non-compliance with the notice received. They find that it is only at certain seasons that the farmer—whose land, as a rule, is the only receptacle for this matter—is in a position to receive it, partly from his land being under crops, and, as at the present time, busily engaged in sowing; so that except where there is considerable garden land attached to a dwelling—and even then there is the difficulty of the crops being upon the ground—it is altogether impracticable for the occupier or owner to dispose of it; most occupiers are fully and painfully alive to the evil, and look to the authorities for help. To follow the notices under these circumstances with the pains and penalties of the law would equal Egyptian oppression, and to summon a few owners who are responsible through structural defect would be attended by no appreciable results.

"Your committee would therefore earnestly advise:—

"1. That the Local Government Board be asked to order your Board to make due provision for removal of house-refuse from premises, and the cleansing of earth-closets, privies, ashpits, and cesspools within their district.

"That the Medical Officer of the Board, together with the Inspector of Nuisances, be placed under government aid.

"3. That the Board at once commence actively the removal of house-refuse from premises, the cleansing of earth-closets, privies, ashpits, and cesspools within their district, in anticipation of an order from the Local Government Board to do so.

"4. That the Board at once take prompt steps to induce owners to erect sufficient and decent closet or privy accommodation, with properly-constructed ashpits; and to facilitate and hasten the carrying out of this they would recommend the house-to-house circulation of notices containing concise instructions to owners as to their liabilities and the inten-

tion of the Board to enforce the same; also information to the occupiers as to their claims upon owners (including water-supply) and how they may obtain redress where these are not complied with, and also of the 'complaint book' lying at the office of the Board.

"Your Committee base their recommendations upon the following grounds:—

"1. They recommend the Local Government Board to be asked to order your Board to make due provision for the removal of house refuse from premises, and the cleansing of earth-closets, privies, ashpits, and cesspools within your district, in preference to advising your Board voluntarily to undertake the same, in order that the radical and beneficial change which your Committee contemplate may not be retarded or a relapse induced by the factious action of any part of this or any future Board who may seek or have sought for place thereon by a pledge to any interested party or parties to carry out 'economy at any price principle; and,

"2. They recommend the Medical Officer and Inspector of Nuisances to be appointed under Government for very much the same reason, viz., to secure prompt attention and the carrying out by your Board of such recommendations or otherwise as may be from time to time advised by them; for your Committee would maintain that the alarming insanitary state of this district has not been brought about by any dereliction of duty on their part, *i.e.*, the Medical Officer and Inspector, but by a consistent and persistent action of the Board to simply shelve the matter through a 'penny wise and pound foolish' policy.

"Your Board will be aware that the question of water supply is in the hands of a separate Committee."

LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.

London School of Hygiene & Tropical Medicine
LIBRARY
18 MAY 1932